



WDBJ-TV, Roanoke Has A Big Heart For Public Service

COST-EFFECTIVE BROADCAST EQUIPMENT. LONG BEFORE OTHERS WERE TALKING ABOUT IT, WE WERE SUPPLYING IT.

At RCA, we've had the basis for cost-effective products for decades: the RCA reputation for quality. And RCA quality starts with equipment design.

Today, we offer that high quality in a complete broadcasting line, with many cost-effective benefits for you.

Whether it's an RCA camera, or a complete system, it'll save.

We offer you cameras, VTR's, transmitters, antennas, film chains, and equipment for automated station breaks, special effects, and more.

Our TK-47 camera, the world's first fully-automatic studio camera, saves studio and personnel time. And our TK-76 is a multi-purpose portable

that's never idle; over 1400 are in use.

The TR-600A quad VTR is modular: it expands as your station does—so you can plan for growth, and save. And our TH-Series 1" helical-scan VTR gives you similar expansion capability in portable and studio equipment.

Innovation, compatibility, flexibility—all are part of the RCA approach.

We help protect your equipment investment—with upgrading. TechAlert. And parts support.

As new developments in technology emerge, we design them into our line of equipment. And we can upgrade our customers' equipment, as well.


So your equipment offers the highest in technical performance, retains the highest market value.

And since long-range cost-effectiveness depends partly on quality service, it's good to know RCA TechAlert Service and parts support are at the ready.

Find out about RCA cost-effectiveness, now.

We can show you how you can better utilize technical personnel, help cut back on lost air time, aid in reducing advertiser rebates, and more.

Contact your RCA representative, or write RCA Broadcast Systems, Building 2-2, Front & Cooper Streets, Camden, NJ 08102.



RCA



Page 8 A Big Heart For Public Service (Cover)

WDBJ-TV, Roanoke, Virginia, has a long-established record of strong public service programming and a dominant position in the market. The "Roanoke Design 79" prime time program series covered here confirms the efficiency of TV in reaching and involving the public.



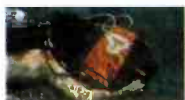
Page 15 WRAL-TV Blankets the "Triangle" Market

TV-5, Raleigh, N.C., planned carefully and built tall. Its 2,000 foot tower is topped by a new CP antenna and accommodates numerous other communications services. Along with the tower, new totally redundant TV and FM transmitting systems were installed.



Page 23 Refining A CP Antenna Design

Development, fabrication and testing of WRAL's CP antenna provides a useful example of the methodology employed by RCA Antenna Engineering.



Page 27 Going Down Under In Australia With The TK-76

The innovative technical staff of Ch. TEN, Sydney, designed a new underwater housing for one of their TK-76 cameras and is finding it easy to go "down under down under". Good Business, too.



Page 31 A Compact Mobile Unit That "Does It All"

Educational station KAET-TV, Phoenix, needed a new mobile unit—and got one. "Agile", "versatile", and "economical" are words that aptly describe the remote unit designed, built and operated by TV-8's technical staff.



Page 34 C & P Telephone Builds A Teleproduction Center

The complete in-house teleproduction center operated by Chesapeake and Potomac Telephone Companies developed as a "grow-as-you-go" system, converting to color and expanding on the basis of performance-generated demand for video services.



Page 39 TV-44 Unleashes A Production Powerhouse

Independent WTOG-TV, Tampa/St. Petersburg, uses mobile units effectively for commercial and program production. Their new 29-footer with three TK-760 cameras is a marvel of flexibility and capacity.

Page 44 Products In The News

Highlighting this section is a report on the new "G" line VHF television transmitters for worldwide standards. Also covered: two new circularly polarized antennas (VHF and UHF); a unique 16mm telecine projector; 1-inch video tape equipment; audio products, and new camera developments.

View Finder

New CP Antenna For WTVD-TV

RCA's TCL-16 circularly polarized broadcast antenna, destined for WTVD, Durham, N.C., undergoes final pattern measurements on the antenna test turntable at RCA's Gibbsboro, N.J. facility (photo below). WTVD, operating on Channel 11 in the Durham-Raleigh area, was the first TV station to pur-

chase the RCA Tetra Coil circularly polarized highband antenna, and will install it this spring atop a new 2,000-foot tower. The TCL-16 is a top-mounted model for use on VHF channels 7 through 13, and has a power gain of 8 in each polarization.

U.S. House of Representatives Installs Broadcast Cameras

The U.S. House of Representatives has installed six RCA TK-46 color television cameras in the galleries overlooking the chamber to provide full-time television coverage of House proceedings.

The TK-46 cameras are mounted on pan and tilt mechanisms for remote operation from a control room.

More Quad VTR's For Unitel

Unitel Production Services, Inc., is continuing the expansion of its New York City commercial and program production facilities with RCA video tape systems.

Two additional TR-600 quadruplex video tape recorders have joined other RCA units installed over the past two years.

Alex Geisler, Unitel's Executive Vice President, said the new recorders are needed to keep pace with a constantly growing workload. They will be interfaced with the company's sophisticated computerized editing systems, and will give Unitel a total of nine TR-600's for production and post production assignments.





SYSTEMS TEST — A production model of RCA's TK-47 automatic color television studio and field camera is checked out by RCA engineer Frank Davenport during systems test in Camden, N.J. Introduced at the 1978 National Association of Broadcasters convention, the fully-automatic camera features simplicity of operation and microprocessor-

controlled functions. The TK-47's automatics extend to the camera set up procedure where microprocessor-controlled systems provide computer-aided semiautomatic set up of the camera, or optionally, totally automatic set up and pre-operational check, at the touch of one pushbutton.

RAI, Italy, Using Fifty RCA TK-76 Cameras For Electronic Newsgathering And Field Production

Radiotelevisione Italiana (RAI) has added 36 more RCA TK-76 portable color cameras to its broadcast equipment, bringing to 50 the total number of such cameras available for newsgathering and other uses.

The camera purchases by RAI, which operates two TV networks in Italy, are valued at more than \$2.5 million.

With the latest shipment of RCA cameras now installed, RAI is in a position to expand its news operation and to augment the outside broadcast and field production capabilities of its stations.

Sixteen of the new cameras earmarked for news coverage will enable RAI to

vary and increase its news program feeds to the First Network (VHF) and the Second Network (UHF) which it operates.

RAI officials said the remaining 20 cameras will be used optionally in an electronic field production configuration, equipped with remote control interface and camera control units.

Introduced by RCA last year, the camera control interface allows the TK-76 camera to be connected to the control unit of the TK-760 studio/field production camera. The belt-worn interface unit replaces the standard battery belt worn by camera operators, and provides a power supply, intercom facilities, an amplifier for the announcer's microphone, and return video for the camera viewfinder.

The interface unit system allows for control of color balance, black level and sensitivity where desired for artis-

tic enhancement of the picture. Operating through the CCU also provides for automatic timing and automatic cable equalization for cable equalization for cable lengths of up to 1000-feet of lightweight 1/2-inch camera cable.

WKRG-TV, Mobile, Upgrades Technical Facilities

WKRG-TV, Mobile, Ala., has upgraded its broadcasting facilities with RCA television studio and transmitting equipment valued at approximately \$350,000. The Channel 5 station is replacing its existing transmitter with an RCA TT-50FL, 50-kilowatt unit, complete with full remote control capabilities.

The purchase order also includes two TK-47 color TV studio cameras, the most advanced and automated in RCA's line; three TK-76 portable cameras, and a TH-100 one-inch video tape recorder.

Group W Orders TV Transmitters For KDKA And WBZ

Westinghouse Broadcasting Co., Inc., (Group W), headquartered in New York City, has ordered RCA color television broadcast transmitting systems valued at approximately \$850,000 for two of its television stations.

The order includes two TT-50FL, 50-kilowatt lowband transmitters, transmission line, and associated equipment for WBZ-TV, Boston, and KDKA-TV, Pittsburgh.

RCA's TT-50FL consists of two 25-kilowatt transmitters combined to deliver a maximum of 50-kW visual power output, while providing full transmitter redundancy.

Fifteen TK-76 Cameras For Storer Broadcasting

Storer Broadcasting Company, Miami Beach, Fla., is expanding the electronic newsgathering and outside broadcast capabilities of four of its group television stations and its Washington news bureau with 15 RCA TK-76 color cameras and accessories, valued at approximately \$700,000.

The TK-76 portable cameras are being placed in ENG service by Storer stations WJKW-TV, Cleveland; WSPD-TV, Toledo; WITI-TV, Milwaukee; and WAGA-TV, Atlanta. The Washington news bureau of Storer Broadcasting is also employing one of the new cameras for newsgathering.

Pacific Video Post Production Center Installing RCA Television Equipment Valued At \$2 Million

The Pacific Video Post Production Center, now in the final stages of construction in Hollywood, Cal., is installing RCA video tape recording and editing systems valued at approximately \$2 million, it was announced today.

Jack Meyer, President, said the ultra-modern post-production facility is opening this spring, and will be equipped to handle the most sophisticated video tape editing requirements in both the quadruplex and one-inch formats.

The equipment being installed includes six TR-600A quadruplex video tape recorders, equipped with AE-600 editing systems, and eight TH-100 one-inch helical scan recorders.

The TR-600A units for Pacific Video feature a fast-shuttle accessory which

greatly reduces tape shuttling time during editing. The TH-100 recorders include TBC-100 time base correctors, and will be fitted with dynamic tracking accessories to produce broadcastable slow-motion and still-frame pictures.

The Pacific Video Post Production Center will offer comprehensive editing capabilities provided by a computerized CMX editing system, Mr. Meyer said.

The new post-production facility will be available to clients of Pacific Video Industries, long experienced in television and motion picture production, as well as to others requiring top-quality post-production work, he added.

Pacific Video Industries operates a completely equipped mobile production van outfitted with RCA studio-quality color cameras, quadruplex video tape recorders, and top-of-the-line switching and audio facilities.

The new equipment purchase for the Pacific Video Post Production Center also includes two TH-50 portable one-inch video tape recorders and an RCA TK-760 studio/field camera which will be used to handle on-the-scene production requirements.

WDR, West Germany, Orders RCA TR-600A VTR's And Editing Systems

Westdeutscher Rundfunk (WDR), based in Cologne, West Germany, is updating and expanding its TV program production and editing facilities with RCA video tape recording equipment, valued at approximately \$600,000.

WDR has placed an order with RCA GmbH., Quickborn, West Germany, for five TR-600A quadruplex video tape recorders for installation in an editing suite at the network's production center in Cologne. Four of the recorders will be equipped with RCA's AE-600 built-in editing system which provides time code editing capabilities.

Major Technical Update For Combined Communications Group

Combined Communications Corp., based in Phoenix, Ariz., is upgrading the technical facilities of its seven group television stations with RCA studio and transmitting equipment valued at approximately \$1.5 million.

Fourteen TK-76B electronic newsgathering cameras and three TK-46 studio cameras are included in the equipment purchases.

KOCO-TV, Ch. 5 serving Oklahoma City, is equipping its new studio fa-

cilities with a TCR-100 video tape cartridge recorder, a complete TK-28 telecine island, and a TFS-121 digital video frame synchronizer. Ch. 5's newsgathering capabilities are being enhanced with four of the portable TK-76B units.

WKLY-TV, Ch. 32 in Louisville is installing three TK-46 cameras and one TK-76B camera. WPTA, Ch. 21 in Ft. Wayne, will install a new RCA TFU-24J UHF broadcast antenna.

The RCA TK-76B cameras also will be placed in service by KBTW, Ch. 9, Denver; KTAR-TV, Ch. 12, Phoenix; WXIA-TV, Ch. 11, Atlanta; and KARK-TV, Ch. 4, Little Rock.

Competitive Edge Productions Adds RCA Cameras

Competitive Edge Productions, based in Albuquerque, N. M., is adding three RCA color TV cameras in an expansion of its commercial teleproduction capabilities.

The company, which specializes in the production of radio, television and newspaper commercials for new car dealers, is installing two RCA TKP-46 studio-quality portable production cameras, and a TK-76B lightweight portable unit.

"We've had to expand our technical facilities to keep pace with rapidly growing demands for quality teleproduction work," according to Lee Galles, President of Competitive Edge Productions.

Video Arts, Miami, Adds Three TKP-46 Portable Cameras

Video Arts, a major teleproduction facility in North Miami, Fla., has expanded its studio and field capabilities with the addition of three RCA TKP-46 portable production cameras. The new cameras, joined a fourth TKP-46 unit already in service at Video Arts.

The studio-quality cameras are being used in the company's 50' x 50' studio and in two mobile units in the production of commercials, features, sports programs, and other TV material.

Palette Productions, Toronto, Expands

Palette Productions Ltd., a television program and commercial production facility in Toronto, Ontario, is expanding its teleproduction capabilities with RCA TV equipment, including three TK-760 studio/field production cameras, a TH-100 one-inch helical scan video tape recorder, and a TH-50 portable one-inch recorder. The new

equipment joins an RCA TK-76 camera already in operation.

Palette Productions Ltd., which is well-known for its quality production of TV programs and commercials in film, is moving heavily into the video tape medium. Don McMillan, President, said the new equipment enables the company to meet the increasing demands for video tape program production in the Toronto area.

Action Movie News Adds Three TK-76 Cameras

Action Movie News, with headquarters in New York City, has expanded its electronic newsgathering operations with three RCA TK-76 portable color television cameras.

Action Movie News, which specializes in independent electronic newsgathering for television, is employing one of the TK-76 cameras in its roving vans serving the New York City area. The two other cameras are for use in the company's expanded operation in Washington, D. C.

New Cameras And Telecine Systems For Videomobile, Caracas, Venezuela

Videomovil, a major television commercial and program production facility in Caracas, Venezuela, is expanding its production capabilities with RCA telecine systems and live color TV cameras.

A complete TK-28 film originating system is being installed, including camera, multiplexer, a TP-66 film projector and a TP-7 slide projector. An RCA FR-35 projector will provide 35mm film-handling capabilities. Two TK-760 color cameras will enhance the company's production capabilities in the studio and on location.

Videomovil specializes in the production of commercials, mini-programs, and highly sophisticated musical shows for airing throughout Venezuela.

Venezolana de T. V., Caracas, Expands

Venezolana de T.V., Caracas Venezuela, which operates two government-sponsored television broadcast networks in Venezuela, is expanding its TV film origination systems and live color TV camera capabilities with RCA broadcast equipment.

The equipment order, placed by the Ministry of Information of Venezuela, includes two complete TK-28B telecine systems, each equipped with a camera, multiplexer, and film and slide projec-

tors. An RCA FR-35B projector provides for 35mm film-handling.

The equipment purchase also includes two TK-760 studio/field production cameras equipped with modification kits for converting the cameras to TK-76B self-contained portable units.

Videosistemas, Caracas, Upgrades

Videosistemas, a television program production facility in Caracas, Venezuela, is expanding its teleproduction capabilities with two RCA TR-600 quadruplex video tape recorders, equipped with AE-600 time code editing systems, and a TK-760 studio/field production camera.

Crossroads Christian Communications, Toronto, Adds Two TR-600 Quad VTR's

Crossroads Christian Communications, Inc., a non-profit religious organization, is increasing the TV program production capacity of its Toronto studio complex with RCA quadruplex video tape recorders.

Two new TR-600 recorders are being added to two TR-600 units already in operation in Crossroads' recording and editing suite.

The TV systems are used to originate the live daily telecast on the Global TV Network of "100 Huntley Street", a 90-minute TV program hosted by the Rev. David Mainse, and to tape record the program for delayed viewing in other areas.

Four other weekly programs, aimed at children, teens, adults and the deaf, are produced in the studio facilities.

In addition to the video tape systems, the studios are equipped with three RCA TK-46 studio cameras, and a fully equipped TK-28 television film origination system.

Israel Broadcasting Authority Places RCA TK-76 Cameras In Newsgathering Service

The Israel Broadcasting Authority, headquartered in Jerusalem, has placed in service four RCA TK-76 cameras, the first to be used in Israel. They are expanding the Authority's newsgathering capabilities which in the past relied entirely on film.

Two of the RCA cameras are being used in a mini-mobile unit constructed locally by the IBA. The other two cameras went operational as stand-alone ENG units. All four cameras operate on the European PAL colour television standard.

RCA Cablevision Systems Awarded \$7 Million San Antonio Cable TV Project

UA-Columbia Cablevision has awarded a \$7 million contract to RCA to supply equipment and installation services for the first phase of one of the nation's largest cable television systems, to serve San Antonio, Tex., and most of surrounding Bexar County.

The contract was won by RCA Cablevision Systems, North Hollywood, Calif., a leading producer of technical equipment used by cable TV system operators to bring TV programming into subscriber homes.

The San Antonio-Bexar County cable facility will extend for approximately 2,500 miles and is scheduled to begin operation this year. Eventually it will provide cable TV service to more homes than any other single system, according to Kenneth Gunter, Executive Vice President, UA-Columbia.

In establishing the new system, RCA will furnish line amplifiers and other devices and will provide overall project management services, according to Neil Vander Dussen, Division Vice President and General Manager, Commercial Communications Systems Division, the parent organization of RCA Cablevision Systems.

The project's first phase calls for installation of approximately 860 miles of cable, Mr. Vander Dussen said, and will require more than 2,000 amplifiers.

Program signals for the system will emanate from nine separate "head-ends" Mr. Gunter said, "a unique concept in cable TV which permits control or program distribution to selected parts of the cable system, and localized programming where desired."

WFMY-TV Moves To Circular Polarization

WFMY-TV, Greensboro, N. C., will begin broadcasting a circularly polarized TV signal late this summer with a new RCA transmitter and antenna system, valued at more than \$900,000.

The Harte-Hanks Communications Inc. station, operating on Channel 2, will install a new 50-kilowatt lowband transmitter and a VHF Fan-Vee circularly polarized antenna.

The new antenna, designated the TFFV-7A2, is a seven-layer system designed for tower top mounting. Each layer is composed of two bays, one for the horizontal component and one for the vertical component of the signal. The bays are properly phased to produce circular polarization.

Radio-Television Belgrade Installing \$5 Million In RCA Equipment

Radio-Television Belgrade (RTB), Belgrade, Yugoslavia, currently is installing RCA color television studio equipment valued at more than \$5 million.

The equipment includes 22 studio, field and portable production cameras, as well as film originating systems and video tape recorders.

Ten RCA TK-46 top-of-the-line studio cameras will expand the program production capabilities of RTB. The installation also includes TKP-46 portable studio-quality production cameras, TK-76 portable electronic newsgathering cameras, and TK-760 studio/field production cameras.

Three TK-28 telecine islands and three TR-600 quadruplex video tape recorders also were purchased.

Part of the equipment will be installed in RTB's main Belgrade studios. The remainder will be used to originate TV broadcasts from the "Sava Centre", a conference and convention center recently constructed in Belgrade.

KDFW-TV Commits To All-Electronic Newsgathering With 14 TK-76 Cameras

KDFW-TV, serving the Dallas/Ft. Worth viewing area, has converted its news operation to an all-electronic basis with fourteen RCA TK-76 portable color TV cameras.

Channel 4 news crews using the cameras produce more than 20 ENG video taped stories a day for airing during regular newscasts, in addition to providing live pick-ups from late-breaking news events on location.

The RCA cameras also cover sporting events and church services, and are used for production of on-the-scene inserts for "News Headlines", 10-second to 2-minute news breaks shown throughout the programming day. An average of 65 of these short news subjects are produced each week.

On the scene recording for the ENG operation is provided by HR-1020 portable videocassette recorders. In addition, Channel 4 operates two micro-wave-equipped vans for beaming pictures back to the station for direct on-air use, or for recording in the studio.

John McCrory, President of KDFW-TV, commented that the timeliness of electronic news and the flexibility provided by ENG equipment has greatly increased the visual exposure of news events on Channel 4 in Dallas.

UPI And RCA Americom Agree To Pioneer New Service

RCA American Communications, Inc., and United Press International have agreed to pioneer a service new to the satellite communications and radio broadcasting industries.

RCA Americom operates two communications satellites known as Satcom I and Satcom II and one will be utilized in the planned service, which is subject to the approval of the Federal Communications Commission.

RCA Americom will install, maintain and provide satellite transmission service to more than 600 receive-only earth stations, each with 10-foot diameter antenna dishes.

UPI delivers its newswire (teleprinter) services to approximately 3,700 radio and television stations throughout the continental United States. More than 900 of these also receive UPI Audio (voice) service, 606 of which now are on a UPI-leased nationwide telephone-grade network, with the service extended to others by private, regional networks.

The RCA proposal, together with documentation of the system's technical feasibility, will be filed with the FCC shortly.

"The satellite relay to a small antenna network that RCA and UPI have developed is a dramatic demonstration of a news company and a communications company working to improve service to the nation's news media," said Roderick W. Beaton, president of UPI. "This new technology will increase the quality and reliability of broadcast distribution to the general public. I hope the FCC will give speedy approval to the RCA Americom filing."

Andrew F. Inglis, President of RCA Americom, said: "We developed this multipoint communications system to make the most of Satcom's unique capabilities."

UPI has ordered a full-time 15 kilohertz (kHz) satellite channel on one of the Satcom satellites, including an uplink to the spacecraft from RCA's Vernon Valley, N. J. earth station. UPI's broadcast service facilities in the New York Daily News Building will feed audio programming and teleprinter news circuits to RCA Americom's New York City operations center, which is linked to Vernon Valley by microwave.

RCA Americom's proposed end-to-end satellite service will be offered to radio networks and radio program distributors, wire services and others with appropriate communications network requirements.

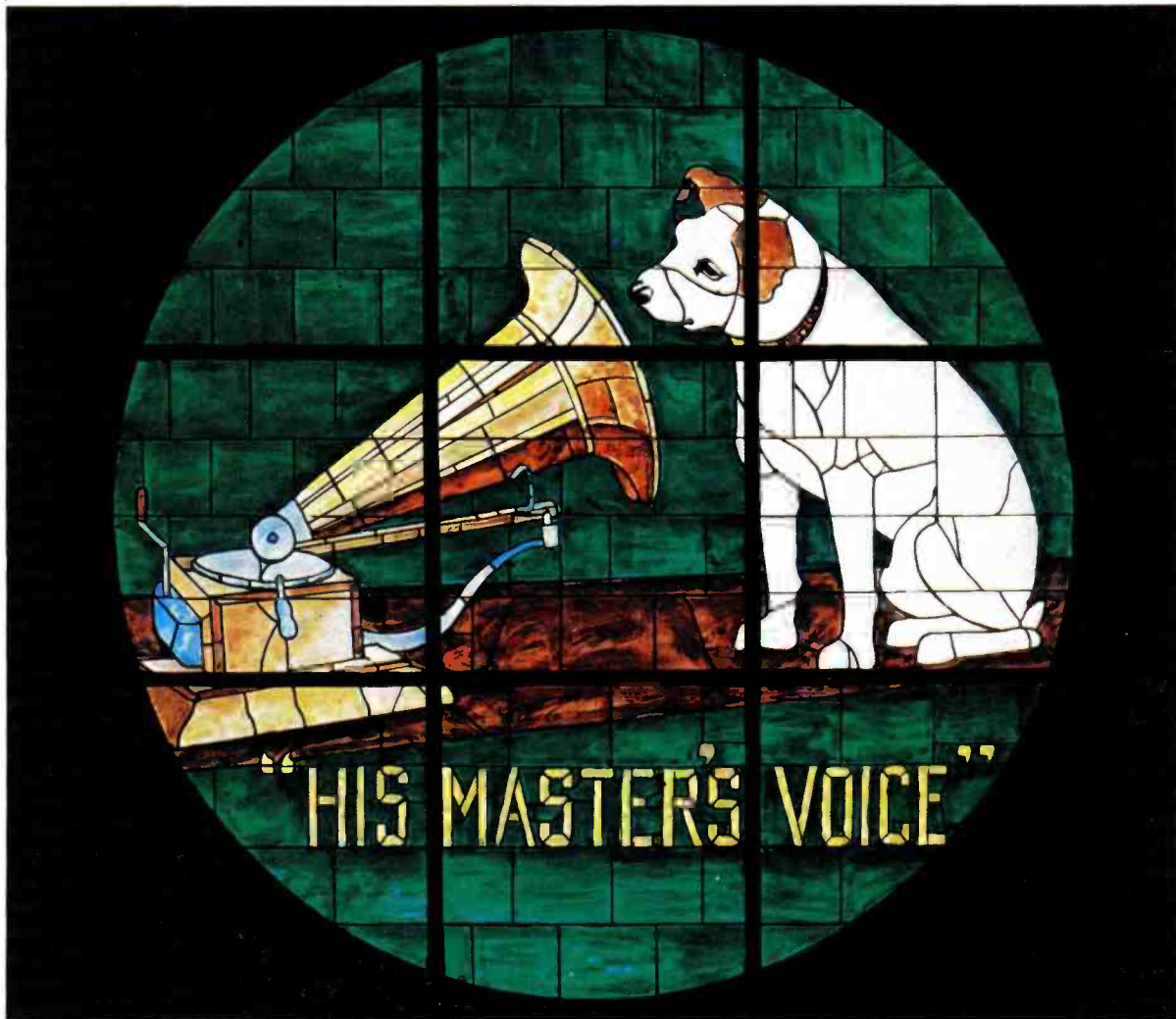
UPI's plans call for multiplexing the 15 kilohertz channel into one 8-kilohertz program audio circuit plus two 3-kilohertz voice grade circuits. The narrow band circuits will be used to distribute UPI's state newswire (teleprinter) services throughout the continental United States.

UPI currently uses RCA Americom's satellite services to distribute UPI NEWSTIME, a picture with voice-over news service, to cable TV systems throughout the country. Americom also transmits UPI Audio news from New York to Los Angeles via satellite, with drops in Chicago, San Francisco and Houston.



TINY TV FILTER — Technician Kenneth Alderson prepares circuitry for installation of a high precision SAW (Surface Acoustic Wave) filter used in RCA's new "G" line transmitters. The filter (foreground) replaces components weighing more than 500 pounds in older model transmitters, and is used to shape and control visual response for enhanced picture quality.

TTG series transmitters and other new products shown at the 1979 NAB are described in the "Products in the News" section of this issue of BROADCAST NEWS, starting on page 44.



WELCOME BACK, NIPPER

After a ten-year hiatus, RCA's famous, familiar dog and phonograph trademark have returned. Four new stained glass windows were installed atop the tower of RCA's Building #17 in Camden, New Jersey to mark the rebirth of "Nipper".

The new illuminated windows, 14½ feet in diameter, show Nipper listening raptly to "His Master's Voice"—and are exact duplicates of the original windows which had been one of the best known landmarks on the Delaware River waterfront for 54 years.

The new windows were created by the D'Ascenzo Studios of Philadelphia, the same firm commissioned to produce the original windows for the tower, then owned by the Victor Talking Machine Company. The original windows were made of opalescent glass, some sections of which were plated in as many

as three layers to achieve tonal effects. The glass for the new windows is lighter and provides a wider variety of finishes and color effects, as a result of improvements in chemistry for glass-making.

The windows portray the painting "His Master's Voice", completed in the 1890s by artist Frances Barraud. The painting was inspired by Nipper, a black and white fox terrier that belonged to Barraud's brother, as he peered quizzically into the horn of a phonograph.

After replacing the cylinder-type phonograph in the original with a disc version, Barraud sold the picture to the Gramophone Company Ltd. of London. Later the artist painted many copies, some of which remain in RCA's possession.

The Victor Talking Machine Company

of Camden acquired American rights to the "His Master's Voice" painting in 1901 and adopted it as its trademark. The symbol began to appear on the company's records and phonographs, and it became one of the world's most widely recognized trademarks.

When RCA acquired the Victor Company on March 15, 1929, the American rights to the trademark were included and the familiar Nipper was used extensively on records, phonographs, radios and later on television sets.

The reappearance of the "Nipper" stained glass windows as a Camden landmark is a part of a major corporate program to make greater use of the dog and phonograph trademark on a wide range of RCA products and in advertising and promotional literature.

Welcome back, Nipper.



**PRODUCES
PRIME TIME
PROGRAMMING
TO SPARK
PUBLIC INTEREST
IN ROANOKE'S
RENEWAL PLAN**

ROANOKE

Full resources of WDBJ-TV—personnel and facilities—were made available for the "Roanoke Design 79" series of programs.



Cover photo and all WDBJ photos
by Ken Wieringo, Ch. 7 Staff Photographer.

With a long-established record of strong public affairs programming and a dominant position in the market, it was natural that WDBJ-TV, Roanoke, Virginia, would be invited to play a leading role in "Roanoke Design 79", a community urban development program.

The project was designed to discover what the public wanted and needed to impel them to return to the core city for shopping, culture, and even to take up residence. The response from a series of four prime time programs produced and aired by WDBJ-TV confirmed the efficiency of TV in reaching and influencing mass audiences. In this instance, the response was an outpouring of ideas; widespread community interest in the renewal project; an ambitious, but "do-able" redevelopment plan. Even more impressive is the bottom line measure of the project's success, which was revealed at the conclusion of the last TV program in the series—a multi-million dollar commit-

ment of private investment money in new construction, as well as promising additional public expenditures and bright prospects for expanded private future capital outlays.

A Commitment Of Time And Talent

It began in September 1978 when the architectural consulting firm of Moore Grover Harper and Roanoke City Manager H. B. Ewert called on Ted Powers, Public Affairs Director for WDBJ, to discuss the use of television to directly involve the public in the revitalization program.

WDBJ-TV accepted the challenge and committed for four prime time programs. The programs were hosted by Mr. Powers, with Ken Ferguson, Creative Producer for WDBJ assigned to the project as Producer/Director.

A format of live call-in phone calls was decided on, a familiar format to Channel 7, since the station has for the past eight years been airing "Dialogue", a

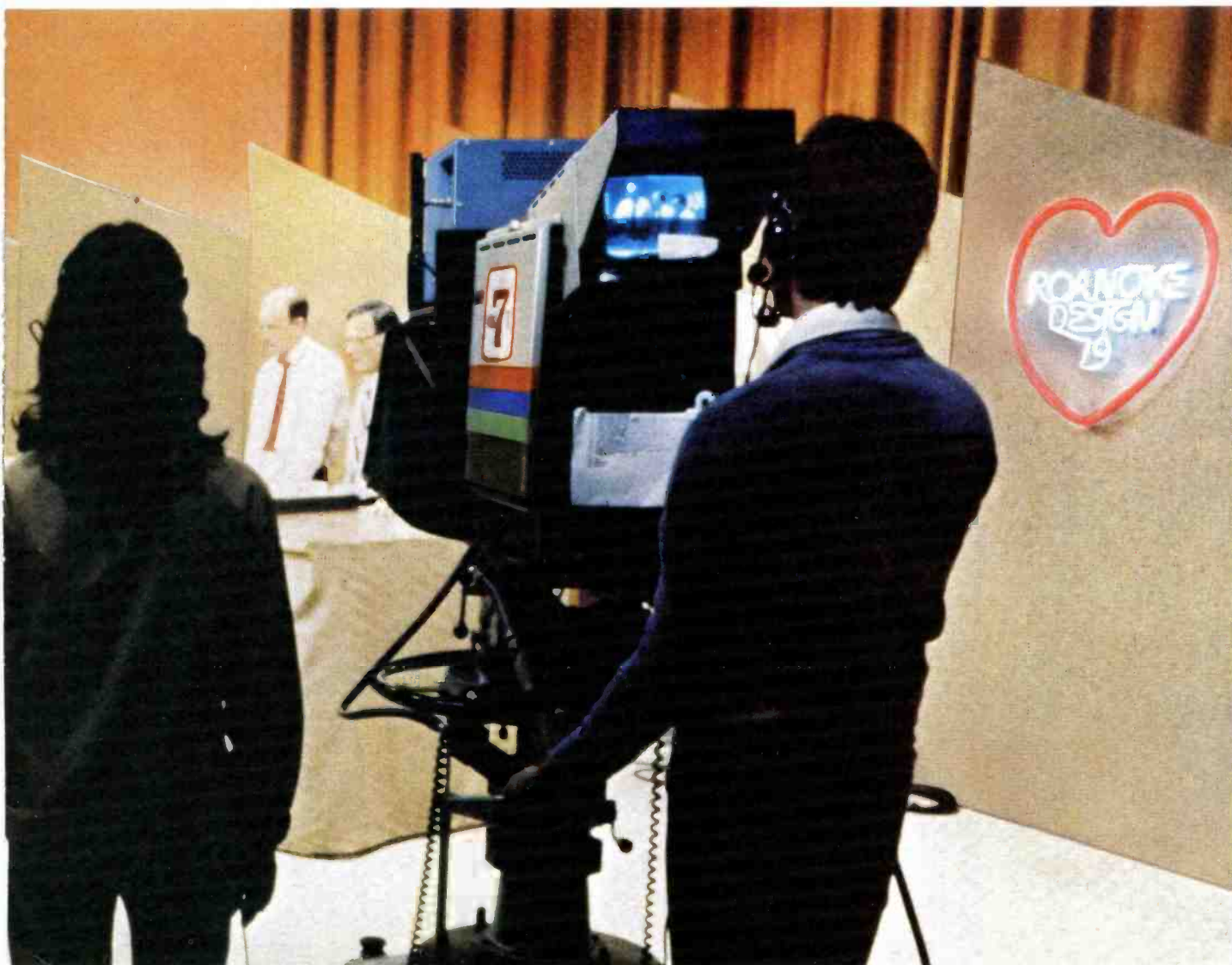
live phone-in public affairs program on Tuesday nights at 7:30 P.M.

The first program, aired on October 24, was co-hosted by Mr. Powers and by Chad Floyd of the architectural firm. Senior partner Charles Moore was at a drawing board, translating the viewers' call-in suggestions into sketches as a camera peered over his shoulder to provide closeups. (Mr. Moore was recently cited in *TIME* magazine as one of America's most influential architects.)

Three-Camera Productions

The show was a three-camera production, with two TK-46's as floor cameras and a tripod-mounted TKP-45 on a catwalk just below the lighting battens. This camera covered the "down" shots of the artist interpreting viewer suggestions.

In preparation for the show, Ken Ferguson had shot footage of various target areas in the rehabilitation plan, using





Initial program in the "Design 79" series used phone-in format, with excellent public response.



Key figures in the program series were Architects Charles Moore and Chad Floyd and Ted Powers, Public Affairs Director for Ch. 7 who moderated the series.

a TK-76 camera. This wild footage was edited on the station's TR-600/AE-600 quad tape system, and dubbed into a series of TCR-100 "carts". The appropriate "cart" for any location under discussion was punched up to make it easier for viewers to visualize the present condition of the area along with the proposed changes.

During the first show, 130 phone calls were handled. Incoming calls were screened, and the most promising were aired, with two-way dialogue between the caller and the studio. More than 2,000 suggestions were generated by the public, with most of these being presented at a downtown storefront office which was maintained by the architects to handle such suggestions.

For the second program, many of the ideas presented were translated and refined for display, and new suggestions were solicited. During the program, viewer call-in suggestions were captioned and posted on large sheets on the set—like election returns.

The third program, presented in December, included three-dimensional

mock-ups of a master plan for the area, incorporating the most economically feasible and popular ideas.

The fourth and last program, January 22, 1979 revealed the final plan in scale model layout form, and also presented the impressive results from this unique public involvement in the city planning revitalization project.

The Roanoke Design 79 programs were a major undertaking for WDBJ, requiring a substantial investment in staff participation. For the call-in programs, the staff included: a Director/TD; Audio Board operator; Time Keeper; two Floor Managers; three camera operators; six telephone operators; an Assistant Director (to screen calls and pass more interesting ones to Director for airing); eight production assistants recording information from calls and posting on the set. In addition, other station personnel assisted with graphics, photography, set design.

Business As Usual

While "Roanoke Design 79" was a full-scale effort, Channel 7 was able to pro-

duce the series without impairing their normal operations. The station is accustomed to producing local programming in generous portions, including more than 25 hours of live broadcasts each week as well as taped productions. The production staff is also active in commercial assignments, accounting for 75-80% of the production done in the Roanoke Valley.

The technical facility, too, is first rate, with a full complement of current equipment and a flexible layout which permits its efficient utilization.

Excellent Technical Facility

Chief Engineer Al Dyson has been with WDBJ for thirty years, and takes special pride in the present television facility, since he was directly involved in its planning and construction.

Channel 7 moved into its new building in 1961, and while the equipment locations have changed, the basic layout has remained essentially intact. In both quality and quantity, Seven's equipment array reflects the station's leadership position in the market. The Tape and Film Room includes two TCR-100 cartridge tape machines; two TR-600A quad VTR's equipped with AE-600 Time Code Editing Systems; a TR-22 VTR, and two TK-28A telecine islands.

The two studio cameras are TK-46's equipped with prompters, and are living up to their reputation as top-of-the-line cameras. The third camera, a TKP-45, provides flexibility for studio production, and is in demand for EFP applications because it can deliver studio quality pictures in the field.

Studio 77, 30' x 40', is used daily for the news and the "Mornin'" shows, with permanent sets installed for these programs. Adjoining Studio 7 is larger, 40 x 60, with a full cyc and lighting grids on battens. It provides more flexibility in lighting and in setting up for major productions such as the "Roanoke Design 79".

To maximize equipment utilization, the two TK-46's roll from one studio to the other. When weather permits, the cameras also roll out to an attractive brick-walled patio at the rear of Studio 7. For further flexibility, the TKP-45 camera is either mounted on a tripod to serve as a third floor camera, or it can be carried to the catwalk above the lighting grids for high shots or special effects.



At WDBJ, the Technical Director usually handles his own switching.



Production Control—"Sub 7"—looks down on the studio on one side and Master Control on the other.

Production And Master Control

Production Control is on the second floor, with a direct view down on Studio 7 on one side, and a view down on Master Control on the other side. This area is designated "Sub-7". The Production video switcher is a Grass Valley 1600-F, and audio is handled by a custom BC-50 console also located in

Production Control. At Channel 7, the Director usually handles his own switching, selecting camera takes, rolling tapes and film. For news programs where timing is more critical, an operator is added to handle switching. Machine controls for the VTR's, film projectors and TCR-100 "cart" machines are all remoted to Production Control.

Master Control consists of a long row of console racks, including the on-air switcher; transmitter auto logger and remote controls; vectorscope and monitoring facilities, and camera controls for the two TK-28 film cameras, the two TK-46's and the TKP-45. Joystick CCU controls are used for the TK-28's. The TKP-45 has a "Minipack" CCU which is mounted on a sliding drawer panel on the console for easy removal.

Master Control handles all on-air switching for network and local programs, except for live local programs. For these, control is delegated to Production Control, "Sub-7". When control is delegated to "Sub-7", the MC operator moves down to the video control position on the console and rides gain on the camera's CCU's.

Audio carts for "voice over" tags are produced in a small announce booth with a BC-7 console.



For Ch. 7, the TK-76 camera "performs superbly and holds registration".

TK-76—A Welcome Addition

The News Department at Seven has been operating for more than a year, and it has been a welcome addition, News Director Jim Shaver reports. "The TK-76 is doing a great job for us. Video tape has really taken a lot of pressure off the newsroom, especially for assembling the 6:00 P.M. news show. It gives us extra time to cover and edit news than film permits."

On the TK-76, Al Dyson adds "We got the camera in December and didn't take the cover off until May. The camera performs superbly and holds registration."

Commercial production at Seven is now about evenly divided between film and video tape, according to Production Manager Bob Crowley, a 40-year veteran with WDBJ. But, he says, the swing is definitely toward electronic field production.

Creative Producer Ken Ferguson, who got his start in the Channel 7 Film Room, is now an avid tape supporter. "Clients prefer tape because it gives them the benefit of instant playback to verify 'takes'." The immediacy of tape production permits doing more in less time, Mr. Ferguson adds.

For example, a local automobile dealer wanted a blitz "Sellathon" campaign to move cars. A director, cameraman, and engineer team using the TKP-45 camera and 3/4-inch tape made 23 spots in a day.



Master Control stretches out, from the Transmitter automatic logging and monitoring on the left to on-air switching and on to camera controls. Note that the TKP-45 CCU (far right) is mounted on a drawer for easy removal to use on location with the rolling equipment rack shown in the inset.



Location shoots involve the Ch. 7 production mobile unit; the self-contained rolling cart with 3/4-inch VTR and the TKP-45 camera.

TKP-45 Field Production Package

As noted previously, the TKP-45 is an auxiliary studio camera and is most frequently utilized for Electronic Field Production of commercials. In this situation, the "Minipack" CCU is mounted on a special rolling cart along with other portable equipment for EFP— $\frac{3}{4}$ -inch cassette VTR; audio mixer; color monitor, intercom. The "Minipack" straps on the front of the cart. Commercials taped with the TKP-45 on cassette are usually immediately dubbed to quad on the TR-600 for editing and production.

Scene Contrast Compression is a useful feature on the TKP-45, Mr. Ferguson says. In addition, the camera's paint controls permit overcoming unusual ambient lighting conditions without the need to update automatic circuits. Being able to tweak the colors when necessary is an advantage in EFP, he concludes, especially where artistic license dictates something other than normal color balance.

Sometimes footage is shot on film and transferred to quad tape for editing. For basic commercials, the film can be transferred to the TCR-100 as a

complete, edited tape. In accomplishing this, the two telecine projectors are loaded with the "A"- "B" film rolls, with all machines operated from the "Sub-7" Production Control Room, with special effects switched in. The Director syncs up on the 8-second mark on the film leader.

When mastering on the "cart", a quad reel dub is also made for back-up, while the first generation "cart" tape is used for air playback.

The A-B dub feature of the TCR-100 is useful in production, Ferguson adds.

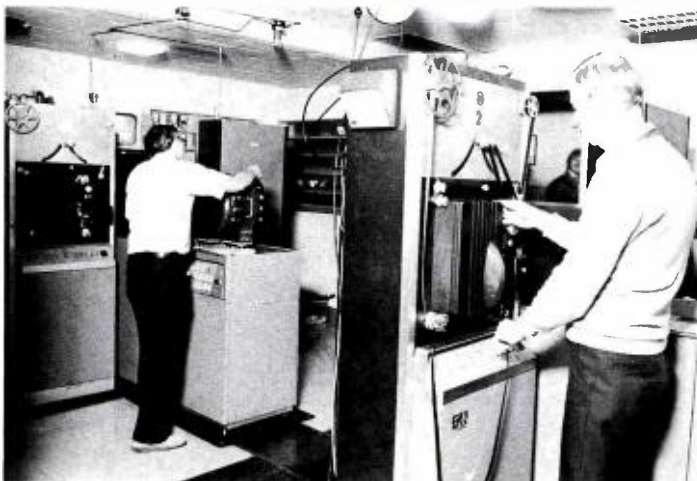
Two "Cart" Machines Well Used

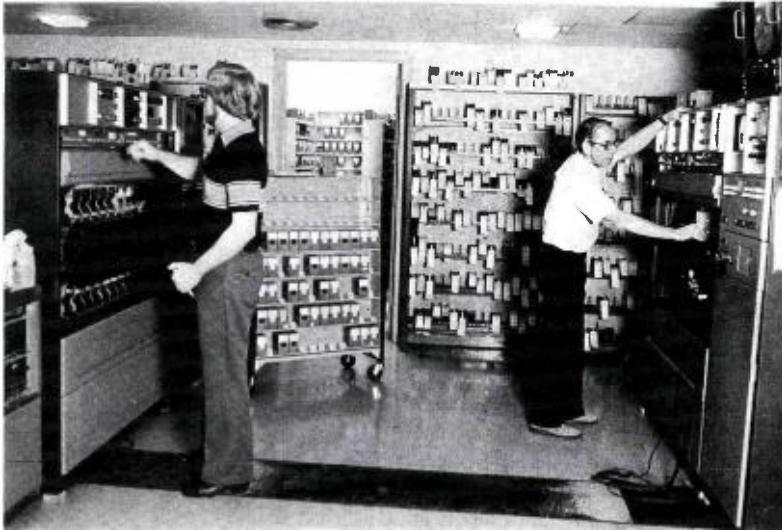
Mr. Dyson verifies the advantages of the "cart" machine, with the comment, "The TCR-100 is the most used piece of equipment in the station. Commercials, PSA's, ID's are dubbed to the 'cart' for airing. And, of course, the 'cart' machine is a valuable production tool. We use it for direct recording of simple commercials because it is faster and simpler. The fast re-cue saves time on 'takes', and the end product is a first generation tape which looks good on-air."

One reason for adding the second TCR-100, Dyson says, is because of the increased usage of the machine for production. In addition, the station prefers to operate with redundant facilities for back-up.

Channel 7's first TCR-100, delivered in 1973, was the 100th TCR produced by RCA, and has logged over 500,000 cycles. The second "cart" machine was installed in 1978, and included the

Telecine facilities include two TK-28 systems.





Ch. 7's two TCR-100 "cart" machines are used for production as well as for airing commercials.

"Random Home" feature which has been helpful in production work at WDBJ. For example, during the first "Roanoke Design '79" program, the TCR-100 was loaded with carts that had been edited and dubbed from wild tape footage of the downtown Roanoke area and its approaches. The Random Home feature of the TCR-100 made it quick and simple to call up a particular "cart" to show an area being discussed by a caller. During this show, the TCR-100 was also used as a "key" source for displaying the phone number to call.

New Quad VTR's And Editing System

The TK-28 film islands find frequent use for production as well as for programming. Film-to-tape transfers are routine. In addition to transferring film commercials to tape, some filmed news material is dubbed to tape for on-air presentation, primarily because it permits faster editing.

During the "Design '79" series, the film projectors and "cart" machine teamed to show the "old and new" urban development area. The film chains were

loaded with slides showing artist's renderings of the core area. When a caller was discussing a particular area, the director would call for a "cart" showing that target area as it now looks, and then dissolve to a slide of the artist's conception of how that area might look.

The two TR-600A quad tape machines with AE-600 Time Code Editing are new additions to the Channel 7 technical facility. Installed in late Summer of 1978, the TR-600A/AE-600 combi-

Video tape facilities include two TR-600A quad VTR's with AE-600 Time Code Editing systems. The editing system is being remoted from the tape area to a separate editing suite.



Creative Producer Ken Ferguson edits with the TR-600A/AE-600 system.



nation is doing an excellent job of meeting production and program needs, Mr. Dyson says. As a producer, Ken Ferguson likes the clean, precise edits he can make with the AE-600. For one program he used a series of tight two-frame edits to achieve a festive, kaleidoscopic effect from tape footage of the Farmer's Market in Roanoke.

The TR-600's replaced two durable TR-22's, with the third TR-22 still in service and performing well.

The next step, Mr. Dyson says, is the setting up of an off-line editing suite, and remoting the AE-600 panels. The editing suite will also be equipped with 3/4-inch cassettes with time code, to permit directors and clients to make edit decisions without tying up the quad machines. Time code will be added when the tapes are dubbed down to 3/4-inch.

Remote-Controlled Main-Alternate Transmitter

Another facility which reflects the technical excellence of WDBJ-TV is the

antenna/transmitter installation which is located on top of 4,000 foot Poor Mountain, some 18 miles from the studio.

The transmitting system includes a TT-50FH, parallel 50 kW system with TW-15, 15 gain Traveling Wave antenna. The transmitter, installed in 1973, is operated as a main-alternate system and is remote controlled from the studio, using a DRS-1 remote control system with automatic logging print-out. The transmitter operates at 23.1 kW output to develop the station's ERP.

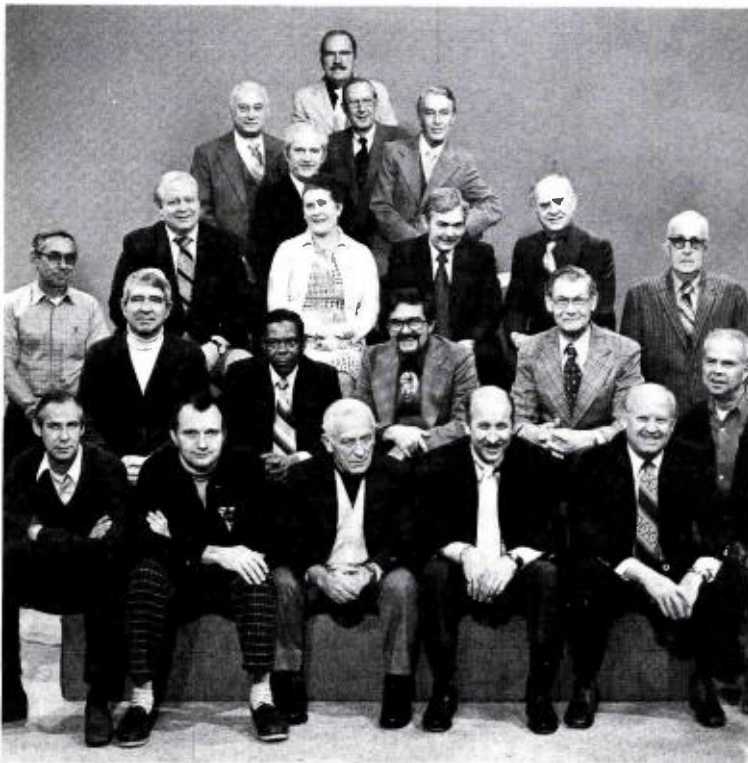
The TT-50FH installation has worked out well used in an alternate-main operation. Switchover from one side of the transmitter to the other is made on Thursday morning from the studio. The on-air transmitter is never turned off—the filaments are left on at sign-off. Sign-on is at 5:55 A.M., and sign-off about 2:30 A.M. At that time, plate voltage is shut off, but the filaments left on.

Mr. Dyson says that his practice is to leave equipment on, running 24 hours a day, at the studio as well as at the transmitter site.

Although the transmitter is remote operated from the studio, the transmitter building is manned on a normal 40-hour a week basis, with one man providing on-site maintenance for two FM transmitters in the building as well as the TT-50FH.

A Leader . . . In Ratings And In Public Service

From the studio to the top of the tower, WDBJ-TV maintains excellent technical facilities. It operates with a large, talented staff, and produces an abundance of local and public interest programming. The station is committed to active involvement in community affairs. The sum total is leadership—in ratings and in serving the public. Channel 7's full participation in the "Roanoke Design 79" project exemplifies that leadership.



A big, happy family. This group portrait of WDBJ employees having 20 years or more service with the station is a reflection of the stability of the organization. About 700 years of broadcast expertise is represented here. Top man is Irving Sharp, announcer, personality, MC and a 43-year veteran at the station. President and General Manager John Harkrader (center, second row from top) has been with the station for forty years.

"To fulfill its public service role, a broadcast station must exercise leadership in the community where it operates, and must be actively involved in that community's affairs."

This credo has been implemented as an operating philosophy of WDBJ-TV by John Harkrader, President and General Manager.

A trim, soft-spoken man, Mr. Harkrader has headed TV-7 for the past twenty years, and is credited with bringing the station to a position of dominance in the market. Except for a five year stint in the Navy during World War II, he has spent his entire 40-year career in broadcasting at WDBJ, starting in 1938 as an announcer with the radio affiliate which is now under different ownership.

Implementing the public service activity of TV-7 is the responsibility of Ted Powers, a cheery, breezy and articulate man who seems ideally matched to the job.

"No station does more in public service than WDBJ," he states emphatically. The list of public affairs programs aired regularly by TV-7 is impressive and covers a broad spectrum of public interests:

- "Dialog"
- "Your Opinion Please"
- "Senior Scene"
- "All About Women"
- "Minority View"

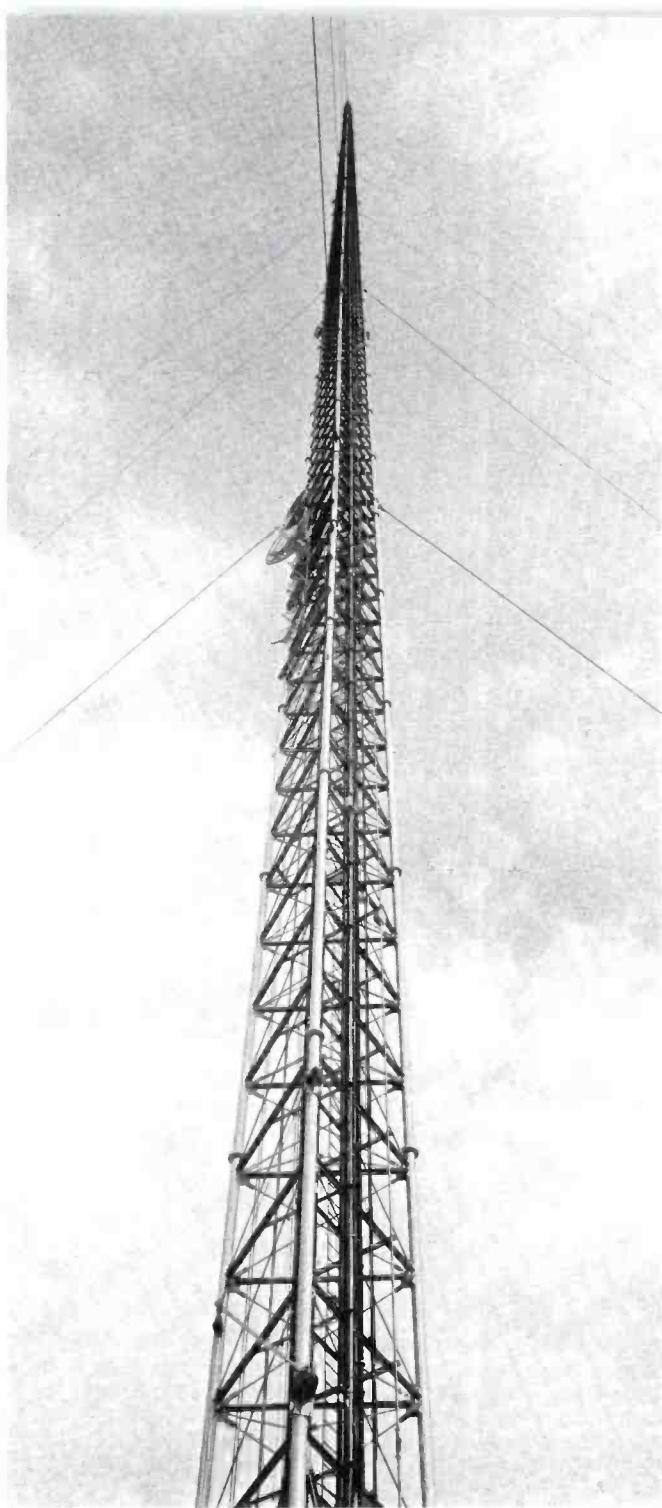
Mr. Powers quickly notes that this strong public affairs programming is a reflection of the attitudes and philosophy of John Harkrader.

Public service has been a hallmark of WDBJ, and undoubtedly has contributed to the success of the station in the market, which it now dominates with a 42 share. In a 1978 *Television/Radio Age* magazine study, WDBJ ranked third nationally among CBS affiliates in the U. S. in share of audience domination in equal facility markets (areas that can tune in all three networks).

WRAL-TV's

NEW 2,000 FOOT TALL TOWER ADDS A NEW DIMENSION

Jim Goodman, President (center) and Lee Poole, Director of Engineering for WRAL (right) are shown the Gibbsboro test range by Dr. Matti Siukola of RCA's Antenna Engineering staff during final test of TFW-7A5 CP Antenna.



RALEIGH

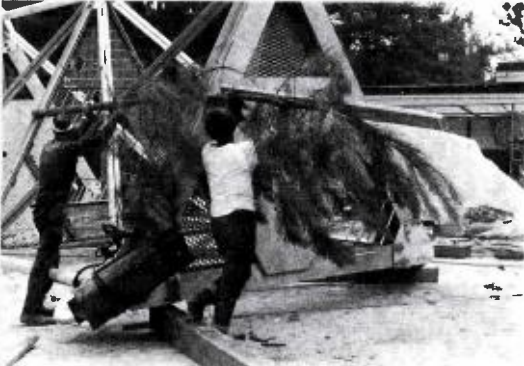
WRAL's "Tall Tower" rises 2,000 feet above the ground in a wooded area near Raleigh, North Carolina. It is the tallest man-made structure east of the Mississippi. But even more significant than its size is the scope of services planned for the new structure *before* it was designed.

The "Tall Tower" consisted of multiple

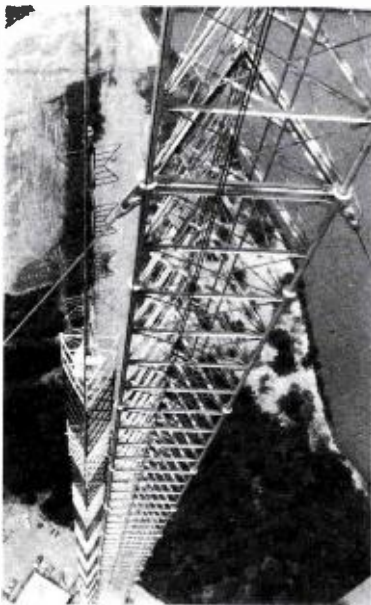
objectives, notes Lee Poole, Director of Engineering for Capitol Broadcasting Company. The primary goal, of course, was to build a state-of-the-art transmitting plant for WRAL-TV and FM. In addition, the tower structure was designed to accommodate numerous other broadcast and communication facilities to generate recurring income.



Crane hoists first section of 2,000 ft. WRAL tower into position.



Topping off. The last section of tower is fitted with a symbolic North Carolina pine tree for the ride to the top.



View from new tall tower looking down on existing 1175 ft. tower at left.

Results Exceed Expectations

The results of the meticulous planning are exceeding expectations, Mr. Poole states. "Our new 2,000 foot tower has increased WRAL-TV's geographic coverage area by 40% and the 50 kW transmitter and circularly polarized antenna are delivering a more powerful, penetrating signal throughout the Raleigh/Durham television market."

WRAL-FM's 40 kW parallel transmitter and a new panel antenna are providing extended coverage and a better signal—although the ERP was reduced from 250 kW to 100 kW to compensate for the tower's added height.

WRAL's Tall Tower project spanned two years. Research and detailed planning took the better part of the first year. During the second, purchase decisions were made and the plan was implemented. The goal was to design and build totally redundant television and FM transmitting systems, and the redundancy WRAL has achieved is total—from the power source to the antenna, with even more back-up provisions for catastrophic emergencies.

The new TV broadcast system includes a TT-50FL, 50 kW parallel transmitter, with a Type TFV-7-A5 circularly 40 kW parallel transmitter and a Type BFJ panel antenna.

Early Planning Included CP Operation

In planning the new tower/antenna/transmitting systems, WRAL's President, Jim Goodmon considered circular polarization from the start. The TV-5 technical staff had closely monitored the tests conducted at WLS, Chicago, and concluded that circularly polarized technology had been proven.

The timing for conversion to CP operation was also right, since it was recognized that it would be far more economical to start with CP broadcasts from the new tower rather than having to make the change at a later date.

Increasing the tower height from 1175 feet to 2,000 feet would in itself provide dramatically improved coverages. But, with the new transmitting system and CP signal, a substantial improvement in signal strength and in reception with indoor antennas was projected.

A Better Picture For a Bigger Audience

The 20-county "Triangle" market served by TV-5 (Raleigh, Durham, Chapel Hill) includes the state capitol, three major universities and an extensive research and light industry complex known as "Research Triangle

Park". The area includes many apartments, with a preponderance of "rabbit ear" and "whip" antennas. The objective of the TV-5 circularly polarized operation was to send this audience a better signal and therefore strengthen TV-5's leadership position in the market. The CP operation has succeeded in delivering a stronger signal—so strong, Mr. Poole notes—that in most cases it is not even necessary to change the orientation of the "rabbit ears" to bring in TV-5 loud and clear.

The circularly polarized TV broadcasts began on November 11, 1978, and Mr. Poole is enthusiastic about the results.

"Coverage with the new transmitting system exceeded expectations. CP does in the field what it was projected to do," he says with conviction.

When measurements were made after the TV-5 CP broadcasts began, it was found that the Grade A signal extended 42 miles from the tower site. In practice, the new system provides a Grade A signal equal to the most optimistic projections.

CP has become a new sales advantage for TV-5, since its better quality signal is easily demonstrated. The signal has reversed the station's competitive position in the market. Prior to building its "Tall Tower" with CP operation, TV-5's major network competition was operating from a 1500 ft. tower and delivering a superior picture to rabbit ear sets within a 25 mile radius. With CP, Raleigh/Durham viewers receive a better signal from TV-5 without having to adjust their antennas.

Before and After— A Significant Improvement

To obtain a quick "before and after" response to the changeover to the circularly polarized TV broadcasts, WRAL enlisted the aid of some 75 amateur radio operators within the TV-5 market area, some as far as 150 miles away.

For two weeks prior to the change, these "hams" monitored reception of the TV-5 signal on their sets, observing picture quality. Some participants used test equipment to measure signal levels at the TV set terminal.

After the changeover to CP operation, the "hams" reported changes in picture quality, and the overwhelming majority reported that the reception of the TV-5 signal had improved significantly.

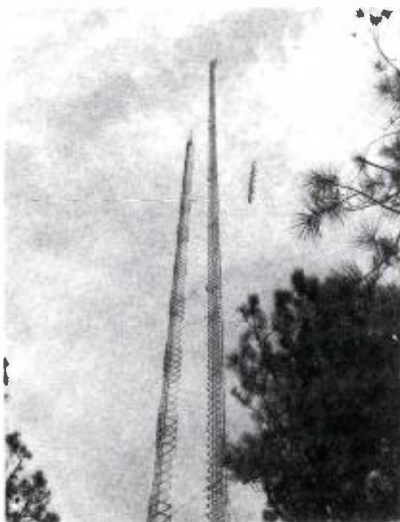


James Goodman, President, watches as Mr. A. J. Fletcher, Chief Executive Officer, autographs top tower section.

Capitol Broadcasting Moves Ahead To Keep Ahead

WRAL's move to the new tower and to circular polarization comes as no surprise to broadcasters familiar with the station and its ownership. Capitol Broadcasting Company was founded by A. J. Fletcher, who served as Chief Executive Officer, and an active participant in the business until his death April 5, 1979 at the age of 91. President Jim Goodman, 35, the grandson of "Mr. AJ" literally grew up in the broadcast business and is the moving force behind Capitol's current growth and expansion.

In addition to TV-5 and FM-101, Capitol Broadcasting owns and operates Seeburg Background Music and Capitol Background Music, the largest independent background music service in the country, and The Triangle Leader Publications. The company's resources also include a relatively large teleproduction facility, with a three-camera mobile unit, together with its studio



New CP antenna passes 1,000 foot level on the way up.

facilities. WRAL(FM), a 24-hour MOR broadcaster, also operates the North Carolina News Network, a service which is subscribed to by 60 radio stations in the state. The Tobacco Network (TN) is aired by more than 300 radio stations from Virginia to Florida, and is produced by the Corporate Division of Farm Services and Rural Affairs under management of Ray Wilkinson, member of the National Association of Farm Broadcasters. Capitol is purchasing WKEE/WKEE FM, Huntington, WV.

"Biggest And Heaviest Tower"

WRAL's tall tower was designed and fabricated by Kline Iron and Steel Company, Columbia, SC. It was assembled on-site by National Steel Erectors, Muskogee, Oklahoma. Crew Chief Willie Workman acknowledged that in his 25 years in the business WRAL's 2,000 foot tower was the biggest and the heaviest that he had worked on. The tower is assembled with five tons of spline bolts which were individually sledge-hammered for a press-fit. Considering the huge scale of the construction operations, the erection crew performed superbly, according to Mr. Poole, and completed the tower on time.

In addition to the top-mount CP antenna and the eight-bay FM panel antenna near the top, the tower is designed to support as many as 42 two-way radio systems. (Provision was also made for accommodating a future circularly polarized circularly polarized antenna installation of the educational [University of North Carolina] station, Ch. 4.)

Additional Communication Facilities

There are seven levels of communication services available for lease, starting

at the 1700 foot level on the tower. A number of systems are already installed.

The communication transmitters as well as their antennas are mounted in place on the tower, with power coming from the ground. The elevator inside the tower permits easy access to service the equipment. The available tower heights are ideally suited for users requiring wide area communications coverage. As a service, TV-5 provided one repeater near the top of the tower for use by radio amateurs.

Solid Steel Construction

An unusual aspect of the new tower is its proximity to the 1175 ft. tower which it replaced. The new tower was erected within 30 feet of the old one, which required careful calculations to ensure that the guys and anchor systems did not interfere during assembly of the new tower. There are three sets of guys, each anchored in four separate locations.

The outer-most anchors are 1400 feet from the tower base. The largest guy wire is 2 1/4" diameter. One run of this guy weighs 14 tons. The tower is designed for 65 pounds windloading—far sturdier than would normally be required. The tower is fabricated from solid steel. There are no tubular steel elements. The entire tower was galvanized to prevent rusting, and since it is strobe-lit, obstruction painting was not required.

Base of dismantled old tower in foreground. New tower was erected within 30 feet of the existing tower.



Tower Lighting System

There are seven levels of strobe lighting—six for the tower, plus the obstruction light atop the antenna. Three 120° flash heads per level provide complete 360° visibility. The light status is monitored from the transmitter building, and lights are pulsed from the ground for synchronous strobing. The lighting system has three intensity modes, so the lights appear the same in intensity during daylight or nighttime. The system includes 5,512 separate pieces.

All of the lighting equipment, including power supplies and electronics is mounted on the tower at specified levels and is accessible for servicing from the elevator.

Battery-Operated Elevator

A sturdy, steel-grated bridge runs from the transmitter building to the base of the tower, protecting and supporting the four transmission lines. The motor for the tower elevator is also mounted under the bridge. The battery-operated elevator runs 1875 feet up the tower. It is designed for maximum safety,

using two sets of cables, although only requiring one. Cable tension is controlled at the ground by a weight counter-balance system. The cables were spun in one continuous piece. The elevator is equipped with a governor system which shuts it down if control is lost. If the elevator descends at faster than its pre-set speed of 230 feet per minute, it clamps to the side rails and stops. An intercom system in the elevator uses insulated induction wire to maintain communications and control contact.

One Up, One Down

The new tower was erected without interrupting service—and then the new tower was used to rig a boom for dismantling the old one.

The dismantled 25-foot tower sections are stored near the new tower, in the proper sequence for rapid erection should a catastrophe drop the new tower. The old guy cables are stored on reels. Even the transmission line and antenna were dismantled and retained, ready for re-use if needed.

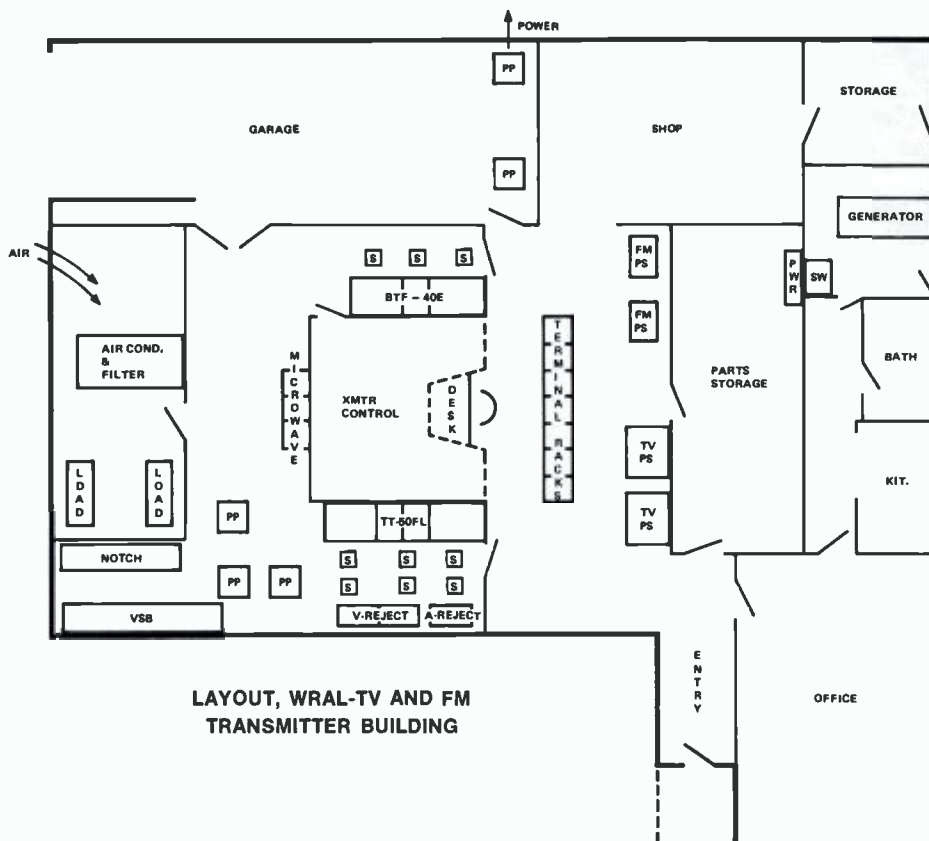
Tower Site—A Fun Place To Visit

The design of WRAL's transmitter/tower site provides another example of the foresight of Capitol Broadcasting management and their policies. The site is on a 275 acre plot of ground which includes a seven acre lake. The area is being developed as an employee park and recreation facility with plans for clubhouse, tennis and basketball courts—even hiking and riding trails.

The well-stocked lake will have a dock and several boats for employee and family enjoyment. This facility will be available to civic groups and other non-commercial functions in the area.

Transmitter Room Layout

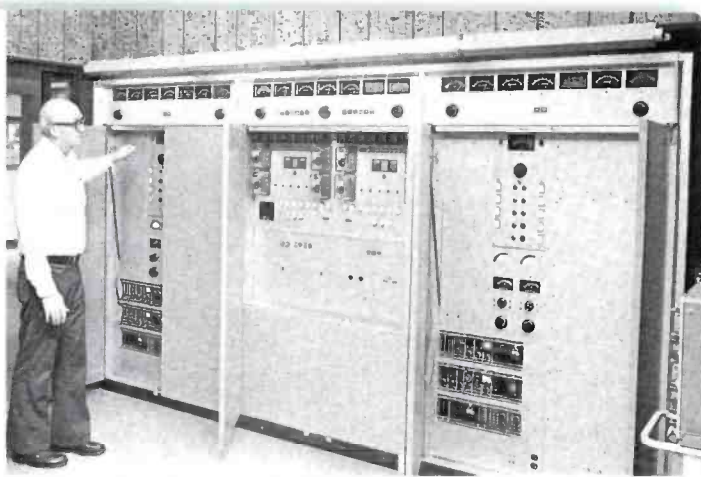
The WRAL transmitter building is a generous-sized facility which was built when TV-5 went on-air in 1956. The available space was utilized to provide an unusual layout of the television and FM transmitters. The transmitters are set up parallel to each other, with the front line cabinets facing in, separated by about twelve feet. A row of microwave racks is perpendicular to one end of the transmitter cabinets. At the other



LAYOUT, WRAL-TV AND FM TRANSMITTER BUILDING



Transmitter engineer in noise-isolated "booth" has full view of TV and FM transmitters and monitoring equipment.



Transmitter Engineer Bob Searcy with TT-50FL Transmitter.

end, a glassed-in, three-sided booth is set up as the operator's position. This arrangement provides direct line sight of all of the transmitter meters as well as the microwave/monitor racks, and provides noise isolation for the operator.

Behind the operator is another row of terminal and monitoring racks, one section of which includes audio tape decks for background music origination, another Capitol Broadcasting operation.

With the TV and FM transmitter operations as well as the additional communication facilities on the tower, the WRAL transmitter building will continue to be a manned operation. An extensive, monitoring/security system of the entire area is installed, controlled from the transmitter room.

Transmitter Environment Carefully Controlled

The front cabinets of the TV and FM transmitters have been framed with panelling. This decorator touch enhances the appearance of the room, but also is functional, since it permits more effective control of the transmitter environment. The air handling system for the transmitters is separate from that serving the rest of the building. The air is clean under positive pressure. Provision is made for recycling the heated air from the transmitters to heat the area. It is set up so that half of the heated air can be recycled during cool weather to warm the transmitter air intake area, and the other half heats the rest of the building.

A separate room at the rear of the building includes a 15-ton air handling and cleaning system plus test loads for both transmitters.

TT-50FL—"A Textbook Picture"

The TT-50FL Transmitter was chosen to provide the added power needed for CP operation and for the redundancy

it offers. Since it went on air, Mr. Poole says that the TT-50FL is "delivering a textbook picture".

TV-5 is operating at maximum ERP of 100 kW horizontal and vertical. The output of the TT-50FL transmitter is 46.5 kW to deliver this ERP with circular polarization, after transmission line losses are accounted for.

New FM Transmitter and Antenna

WRAL-FM, 101.5 MHz, was a pioneering FM station, super-powered, with "Grandfather" authorization to operate at 250 kW horizontal and 150 kW vertical from a 1,000 ft. tower. With the building of the new tower, a decision had to be made of whether to retain the "Grandfathered" super-power operation, or to re-locate the antenna at a higher level and operate at lower authorized power. After a thorough review of the possibilities, with projected measurements, it was decided to operate at 100 kW vertical and 100 kW horizontal, with a new type BFJ 8-bay panel antenna mounted at 1890 feet on the new tower.

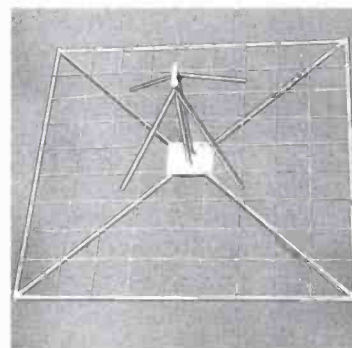
The decision was even more difficult, Mr. Poole affirms, because the replaced antenna, a BFG-16 was relatively new and had been delivering excellent results. However, the decision was justified, since the new antenna has greatly improved omnidirectivity and signal strength. The changeover was made in November 1978.

The projected loss in signal in reducing power from 250 kW to 100 kW was 4 dB, and the increased height of the antenna was projected to add 6 dB to the signal strength, or a net projected improvement of 2 dB. The actual improvement, Mr. Poole says, was much better than projected.

The new BFJ antenna design is credited with much of the improvement, since it is nearly omnidirectional and

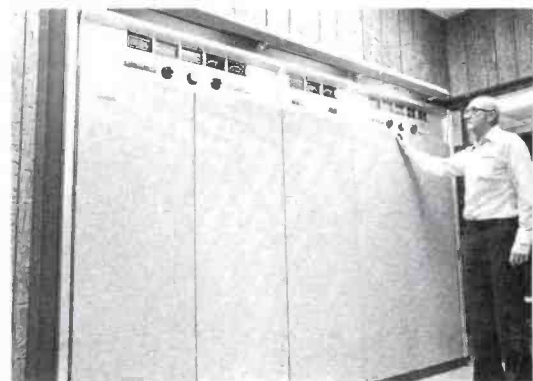


Equipment racks behind operator position.



BFJ FM Panel Antenna has produced excellent results for WRAL-FM.

BTF-40E, 40 kW FM Transmitter.



includes $\frac{3}{4}^\circ$ beam tilt and 10% first null fill, providing excellent coverage close-in, while the increased tower height extends the fringe area coverage.

Transmission Line Redundancy

Redundancy is the watchword of the WRAL transmitting operation. From power source to antenna, back up systems ensure that failure of any single component can not put the system off-air.

The redundancy extends to the transmission lines. Four separate lines run up the 2,000 foot tower—two for TV and two for FM.

The TFV-7-A5 "Fan Vee" is a seven-bay circularly polarized antenna. To provide redundancy, the output of the TT-50FL transmitter, which is combined in the notch diplexer, is then split by a custom power splitting tee so that one transmission line feeds the upper four bays of the TFV antenna, and the other feeds the lower three bays.

Similarly, the single feed output of the BTF-40, 40 kW transmitter is split into

two feeds to the eight-bay FM antenna, a new BFJ panel type. This is set up as a four-plus-four, so the FM station can generate full licensed power on one transmission line and one set of bays. Either line or either antenna section is capable of handling full power.

The parallel TV transmitter, parallel FM transmitter and dual transmission lines for each permits up to 64 switching combinations to prevent loss of air time, according to Mr. Poole.

No Lost Time During Changeover

TV-5's old transmitter was replaced without losing air time. The major problem was with the complexity of the transmission line between the old installation and the new line to be installed.

The problem was resolved by Transmitter Supervisor Ed Hubbard who made a scale model of the entire transmission line coax layout—old and new—using every available size dowel from a lumber yard.

The scale model assured that all the components would fit properly into

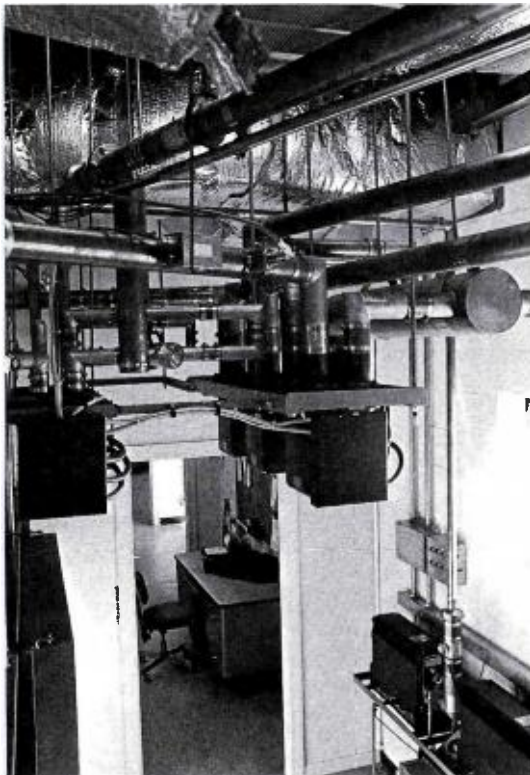
the available space—before cutting the line. A custom layout was dictated by existing equipment and building arrangement. The entire installation of the transmitter and the line was handled by the WRAL transmitter engineering staff of eight—cutting, fitting, hanging, assembling. It was a difficult, painstaking operation. The plan for total redundancy complicated the installation, since it required two separate runs of transmission line for TV and two more for FM.

The new system utilizes some 8,000 feet of transmission line. Universal type line was specified, and all lines are gas tight, reports Mr. Poole, with no leakage in any of the lines up the tower or inside the transmitter building.

Dry air pressure is maintained on all transmission lines, which are electronically monitored for temperature and humidity. Should a problem occur with the dry air system, a back-up nitrogen system can be switched in.

250 kW Emergency Power System

A 240 HP Caterpillar emergency gen-



TT-50FL combining and switching—overhead.

Wall-mounted Vistigial Sideband Filter for TT-50FL.



erator on site can generate up to 250 kW—enough to carry the entire plant. Fuel is stored for up to four days of around the clock emergency operation.

The primary power system is monitored electronically. If any leg of the power line goes down for more than two seconds, the monitoring system turns on the generator. When power has been restored for five minutes, the monitoring system allows the generator run for five additional minutes before shutting down, with all functions automatic.

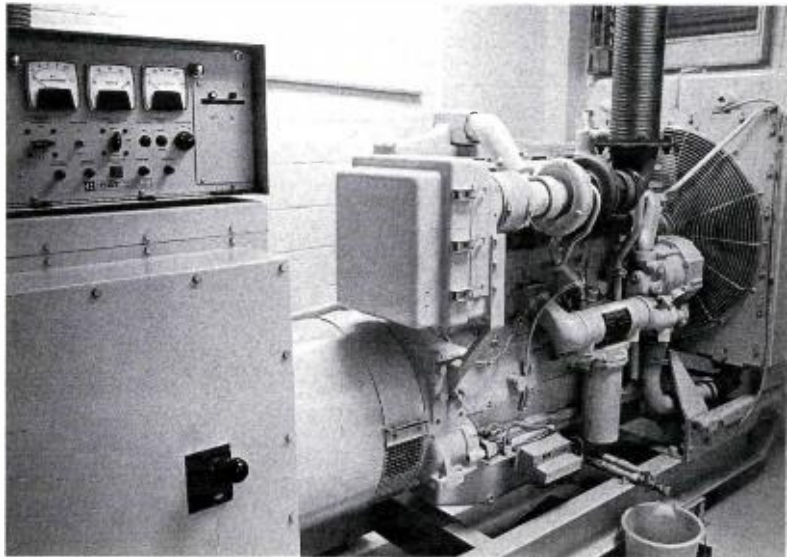
Corporate and Studio Facilities

Typical of the foresight of Mr. Fletcher, TV-5 still occupies the facility it started with in 1956, although there have been major expansions and renovations. A newer building houses corporate administrative offices. The FM radio operation is located in a 4500 square foot facility in North Raleigh, and the background music operation is also in a separate location.

TV-5's studio layout includes two production control rooms; two audio rooms; Studio A; Studio B; Master Control; Telecine; and a TCR-100A with EPIS for air operations, and Video Tape.

The studio equipment complement includes two TCR-100's. One is used for air playback of commercials, and the other is used for production, including newscasts. Both are used for cart transfers. All spot taping at TV-5 is on reel-to-reel, then dubbed to cart.

There are two new TK-28 telecine systems with the camera mounted inboard in the TP-55 multiplexer. Film spots are also transferred to "cart".



250 kW Emergency Generator.

WRAL-TV provides the Southeast regional insert for ABC network programs, using the playback TCR-100 "cart" machine to substitute commercials. This arrangement permits market selectivity in scheduling commercials for national network programs.

Studio "B" includes three permanent sets—News; a kitchen, and a living room. Studio "A" is used for major productions and has rolling bleachers and a continuous cyc for audience shows, such as wrestling matches.

Video Tape Production Center

The video tape production facility is

housed in the lower level of the studio building, and includes a complement of four TR-70B VTR's and one of the TCR-100's. This "cart" machine is designated for production and is equipped with the EPIS cartridge identification accessory which identifies and provides a readout of threaded and cued cartridges.

Air, temperature and humidity are carefully maintained in the tape areas. A central high pressure air system serves all of the tape machines, and there is also a back up system. In addition, each tape machine has its own air system.

CP Receiving Antennas

What is happening with the development of circular polarized receiving antennas? WRAL is working with JFD, a major home antenna supplier located near Raleigh (at Oxford, NC). At present, the design for a CP receiving antenna is complete, and units are ready for production. WRAL plans to buy a quantity for installation in problem areas. These will be made available to TV-5 viewers at nominal cost, Mr. Poole reported.

Strong Newsgathering Operation

The TV-5 local news operation has built a strong newsgathering organization, with popular air personalities on the news, sports and weather desks. Two fully equipped "Action-Cam" vehicles are used for ENG news coverage, along with four CP-16A film crews.

As a part of the "Tall Tower" promotion, TV-5's weatherman, Bob DeBar-delaben, had the rare honor of doing his weather report "live" from the top

of the tower, sharing the platform with a mini-cam operator and Lee Poole. There has been no request for an encore.

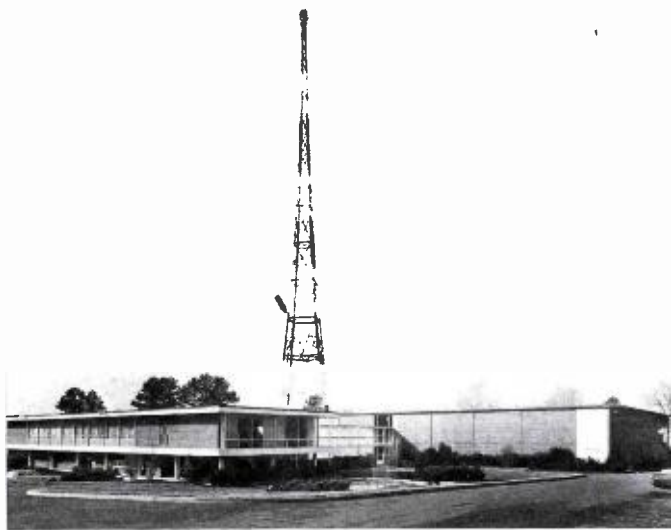
CP Surge In North Carolina

The WRAL-TV tall tower and CP operation has served as a trend-setter for North Carolina television. Already Ch. 11, Durham is going to CP operation with a TCL Tetracoil CP antenna from RCA. Ch. 7, Washington, NC, and Ch. 2, Greensboro are also going to CP, with 2,000 foot towers and operating

at maximum power. Educational Ch. 4, in Chapel Hill is also looking to CP in the future.

A Better Picture, Bigger Audience

WRAL-TV's new 2,000 "Tall Tower", new transmitting system and circularly polarized signal have been a winning combination in delivering a better picture to more viewers in the "Triangle" market area. But then, that's the way it was planned. □



WRAL corporate and studio facilities.

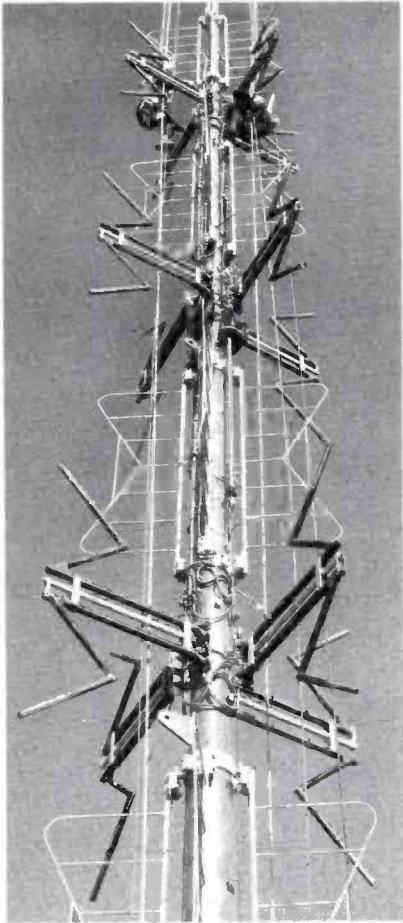


Master Control.



Tape complement for WRAL-TV includes TR-70's and two TCR-100 "cart" machines.





HOW RCA ANTENNA ENGINEERING "MOTHERS" A NEW ANTENNA

The development, fabrication and testing of the Fan Vee circularly polarized antenna for WRAL-TV provides a useful example of the methodology employed by the RCA Antenna Engineering activity at Gibbsboro, N. J.

When WRAL ordered their Fan Vee for Channel 5 operation, the product design had already been completed and CP antennas of the TFV type had been fabricated and shipped for Ch. 6 (XETV) and Ch. 4 (WTTV).

Each of these antennas had been carefully checked and tested for satisfactory operation on their channels, and a similar procedure was followed for the WRAL antenna.

The Fan Vee is a top-mount Channel 2 through 6 antenna. The vertically polarized and horizontally polarized radiators are independent of each

other and the antenna consists of seven layers of horizontally polarized radiators and seven layers of vertically polarized radiators. The reason that this antenna requires seven rather than six layers is directly related to the conservative approach taken by RCA to meet published specifications.

In the early design stages of the Fan Vee, it appeared from the vertical single layer patterns that the gain would be approximately 0.5 per layer. But, when several layers were built and tested, it was found that the mutual coupling between layers at the required spacing caused distortion of the single layer vertical patterns, reducing the gain. As a result of these tests, it was determined that the final antenna had to have seven rather than six layers to meet the specified gain of three per polarization.

Aerial view of the RCA Antenna Engineering, Assembly and Test facility at Gibbsboro, N. J.



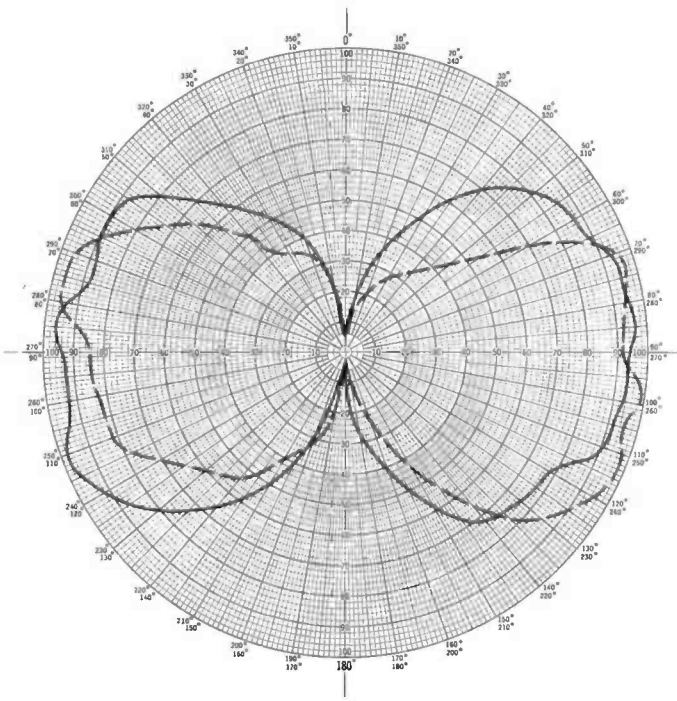


Fig. 1

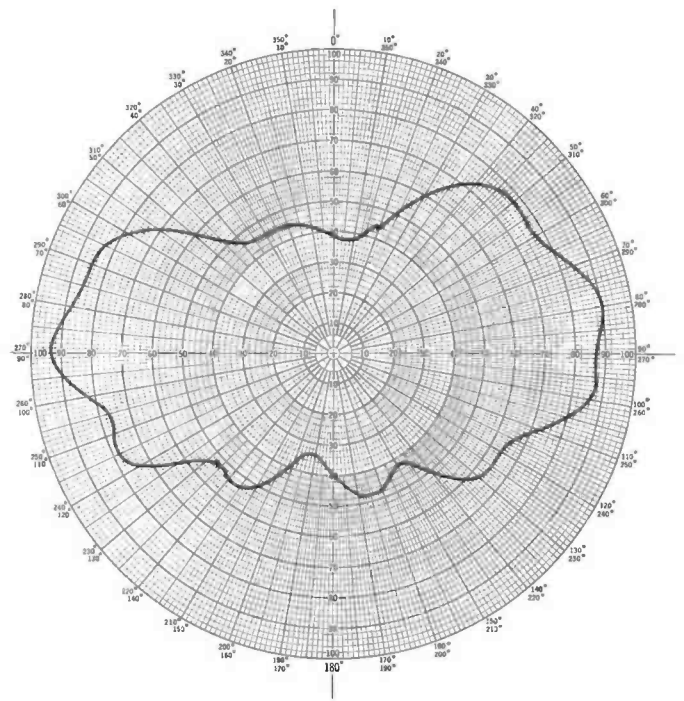


Fig. 2

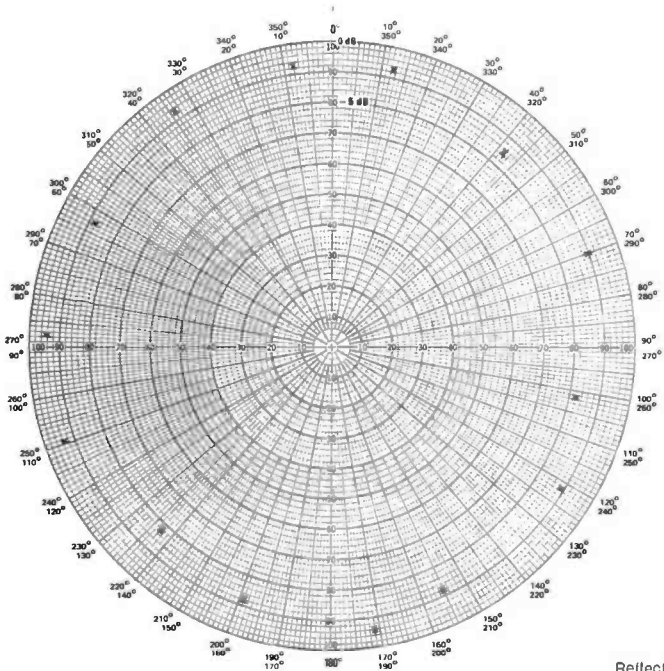


Fig. 5

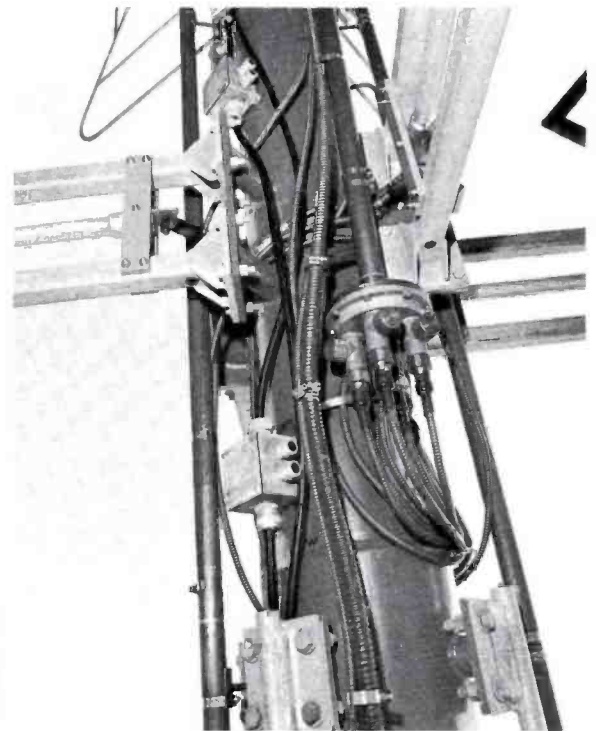


Fig. 6

Reflectometers at each feedline connection permit taking Smith Chart Plots of each separate feedline.

THE COMPLEXITIES OF ANTENNA GAIN

The design and development program for the new series of RCA circularly polarized antennas involved highly complex mathematical calculations of gain and loss. Some of the formulas, computations and conclusions are covered in a paper presented by Dr. Krishna Praba of the RCA Antenna Engineering staff at the Fall 1978 IEEE meeting in Washington, D. C. The paper, entitled "Factors Involved in Gain Determination of a TV Antenna", identifies the loss factors which an antenna designer needs to consider in computing gain. Among those factors that need to be accounted for are:

(a) I²R losses in the feed system and antenna elements

(b) The effect of null fill and beam tilt on gain

(c) The pattern variations if the antenna is not perfectly circular, and (regardless of horizontal pattern) that the total energy radiated from 0-180° is included in the gain calculation or measurement.

(d) The vertically polarized component in a horizontally polarized antenna

(e) That there is a safety factor to allow for the effect of component tolerances on the calculated gain (unless gain is to be determined by measurement after assembly).

Reprints of Dr. Praba's paper may be obtained from Broadcast Systems field offices or from RCA Antenna Product Management, Camden, N. J. 08102 by requesting Form 3J6112.

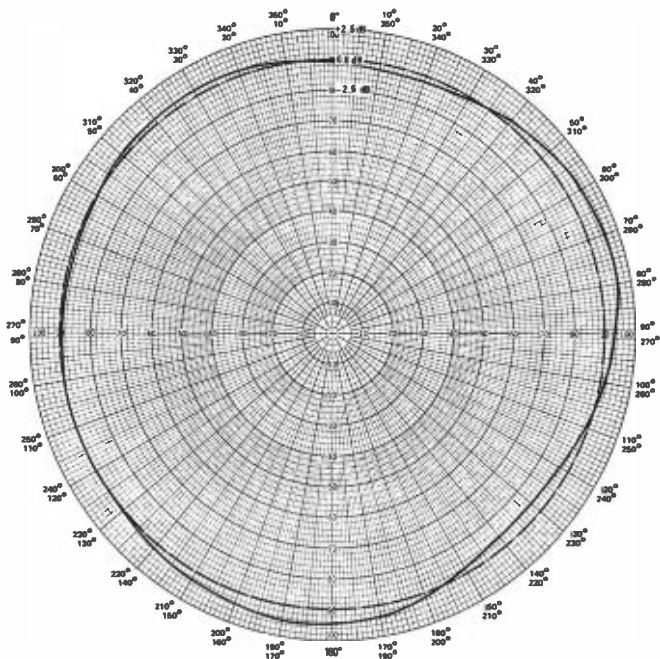


Fig. 3

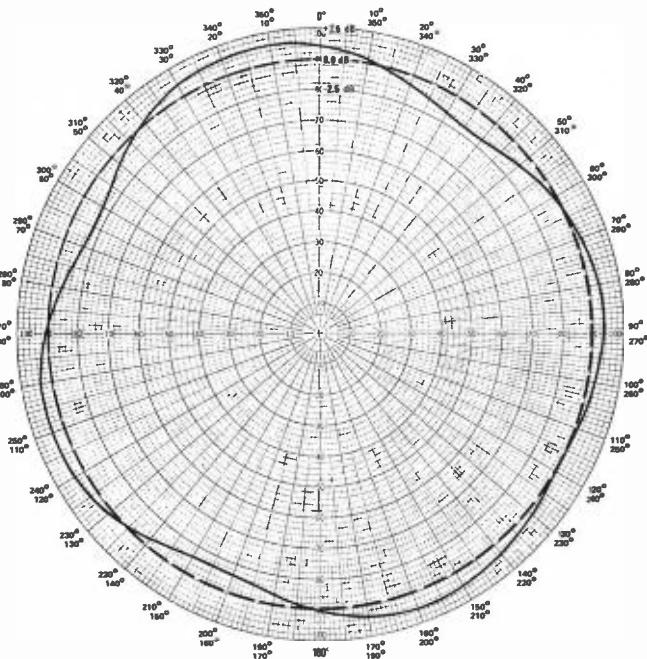


Fig. 4

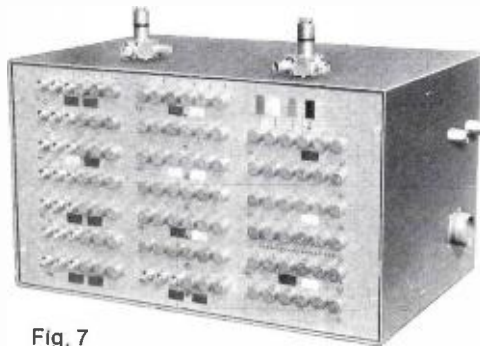


Fig. 7

Switching Matrix permits sampling the input and output of any feedline reflectometer.

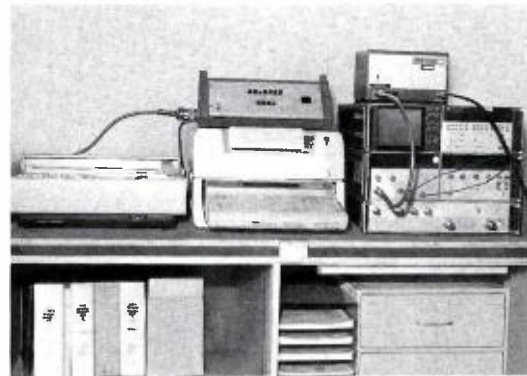


Fig. 8

"S" Parameter Computer produces Smith Plot Chart of impedance of any selected feedline.

It is not unusual to find that CP antenna radiators do not generate for both the vertical and horizontal components the "figure 8" vertical pattern (Fig. 1) which is required to generate a gain of approximately 0.5 per layer. As shown in Fig. 2, elevation patterns for CP antennas tend to have substantial radiation up and down, which would require more layers per given gain than is desirable.

Fig. 3 and Fig. 4 are the Horizontal-

ly Polarized and Vertically Polarized measured patterns of the Fan Vee Antenna.

The measured 2.7 dB axial ratio is shown in Fig. 5.

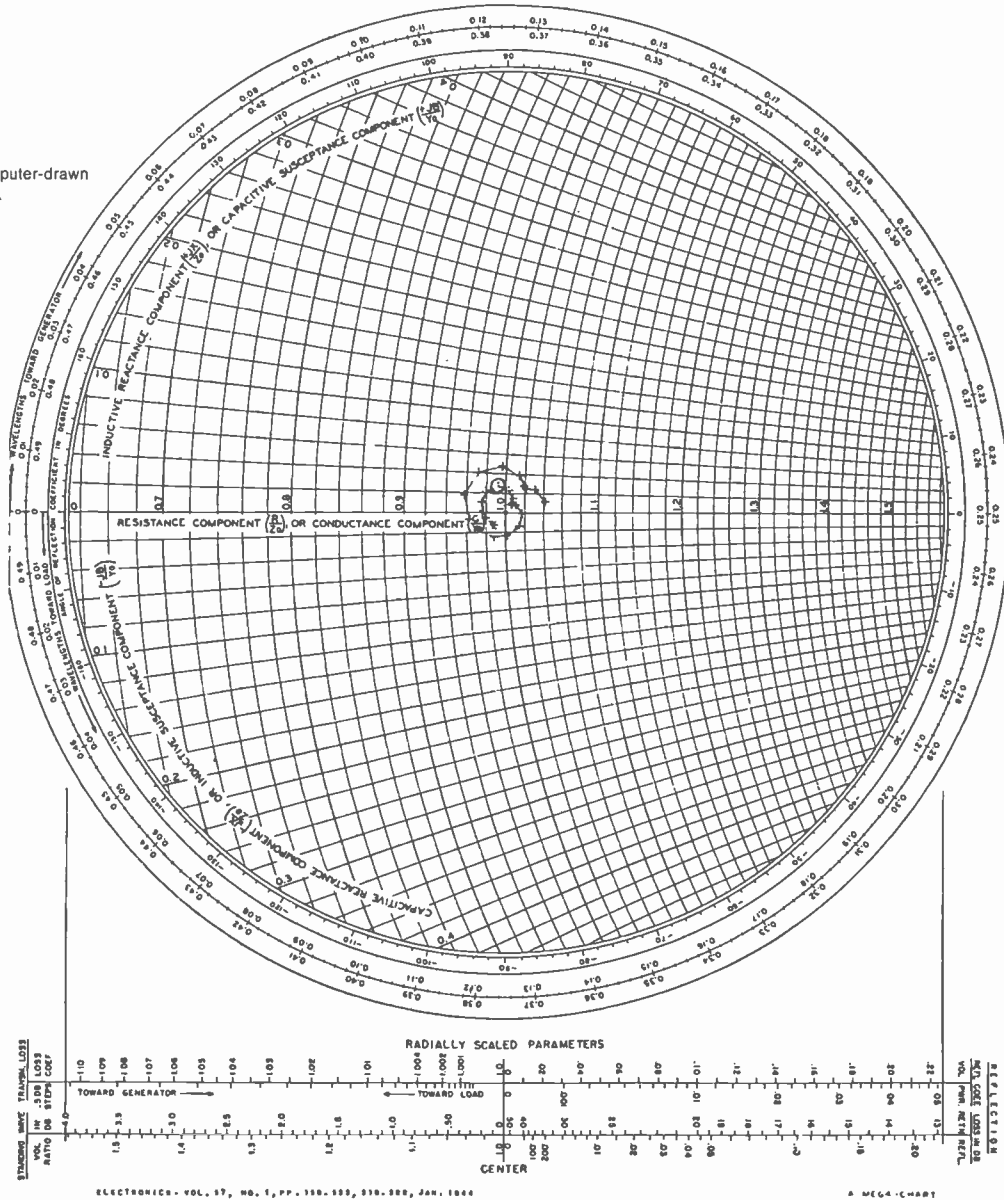
The Fan Vee Antenna employs eight feedlines per layer, 56 for the seven layers. The feedlines for each layer terminate in a Junction Box, as shown in Fig. 6. In developing the Fan Vee for optimum performance on each in-

dividual lowband channel, RCA engineers devised a unique way of taking a Smith Chart Plot of each separate feedline.

This is accomplished by installing a reflectometer at each feedline connection to the Junction Box. Each reflectometer is connected with two 1/8-inch copper coaxial lines to a remote-controlled switching matrix at the base of the antenna (Fig. 7).

IMPEDANCE OR ADMITTANCE COORDINATES

Fig. 9
Typical computer-drawn
Smith Chart.



The switching matrix permits sampling the two coax lines from any reflectometer. This data is fed into a Hewlett-Packard "S" Parameter Computer (Fig. 8) which manipulates the data and produces a Smith Plot Chart of the impedance of any selected feedline. The computer can compute and draw on a Smith Chart the VSWR for each feedline, even if the reflectometer front-to-back ratio is only 1 dB. A typical computer-drawn Smith Chart is shown in Fig. 9.

The use of reflectometers and the switching matrix provides an accurate

and convenient means for verifying that power to each batwing is equal and that there are no resonances in the feed system. Both factors are important in being certain that the antenna is working properly and that the design safety factors are achieved. Feedline resonances in any antenna can cause high currents and feedline burnouts.

The testing and measuring procedure detailed here is required only for the first antenna developed for a particular channel. The same data can be used in assembling later antennas for that specific channel.

After completion of measurements of the antenna at Gibbsboro, the reflectometers and their 1/8-inch coax lines are removed.

The result of the trimming and adjusting is a resonance-free feed system and proper power distribution among the radiators.

The extra care and "mothering" at the RCA Antenna Engineering center is a contributing factor in maintaining superior on-air performance after the antenna is installed. □



Channel TEN's impressive ENG fleet includes a helicopter as well as microwave-equipped land mobile units.

TK-76 Camera in special underwater housing goes down under on assignment for Telprom.



TAKING THE
TK-76
DOWN
UNDER
DOWN
UNDER

SYDNEY

Busy Channel TEN, Sydney Australia, exemplifies a challenging video operating environment in which innovation thrives.

There a progressive management adds new television facilities to expand services and profit potential. And, once the new equipment is in place, the station's creative staff exploits new possibilities for its utilization.

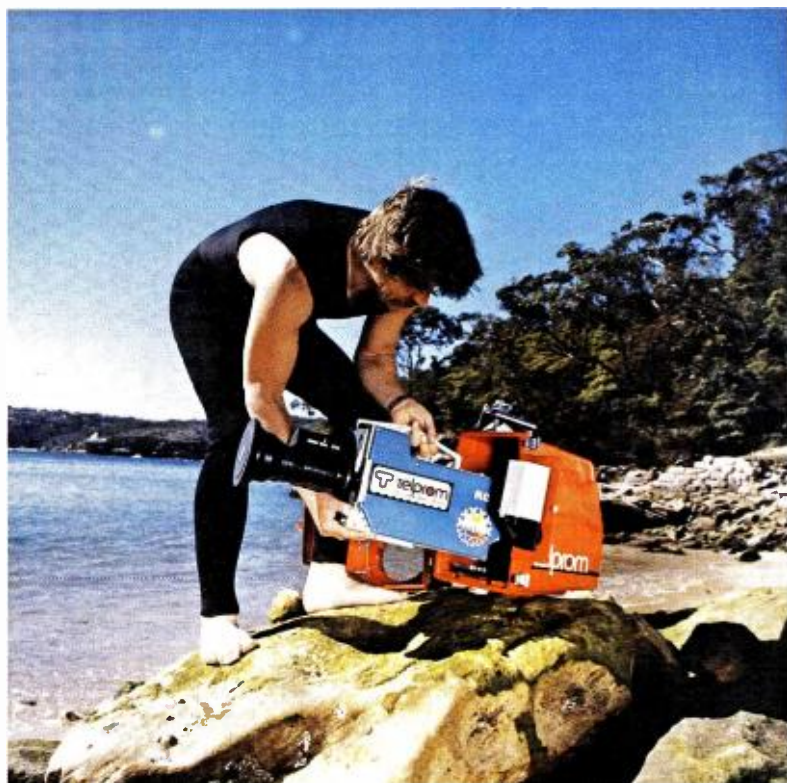
A recent example of this "innovation in action" resulted from a requirement of Telprom, the commercial production subsidiary of Channel TEN, for using a TK-76B camera on underwater assignments.

New Underwater Housing

The TEN technical staff, accustomed to such demands, responded with a custom Video Underwater Housing

(V.U.H.) which has created somewhat of a sensation—and has generated a substantial increase in underwater video assignments for Telprom. The new housing also added a new dimension to Telprom's promotional slogan, "Do It Down Under On Video".

It was a case of demand creating the product, then the product creating demand and ideas. Telprom was briefed on a commercial that involved underwater shooting of swimming pools. To handle the assignment with the TK-76 camera, an underwater housing was required. Telprom's creative directors placed the problem firmly in the lap of their engineering staff. They investigated the possibility of purchasing a housing off the shelf and could not find a unit that met their rigorous requirements.



Stringent Technical Requirements

A local company, Sea Tite Products, of Engadine near Sydney, were commissioned to construct the V.U.H. after extensive briefings by Telprom's engineering division. The design criteria for the V.U.H. was that it could accommodate a TK-76B, be capable of working to a depth of 50 meters, have available control for the diver/camera-man of On/Off, White Balance, Momentary Iris and an internal power source. A standard battery belt was selected as the best source of power, since it did not require that various power supplies had to be transported with a camera used in various modes of operation.

Because of the magnification effect during underwater photography, it was decided that the housing had to also accommodate the lens with a Retro-

zoom Adaptor. This has also proved to be a correct decision, and was not a problem as Channel Ten have standardized on Angenieux 15:1 lenses on their six TK-76's (including the camera assigned to Telprom).

Maiden Descent In Barrier Reef

Initial testing of the housing was carried out in the staff swimming pool at the company's North Ryde studios. During these tests it was determined that the Momentary Iris control was superfluous, as the Auto Iris tracked the transitions from above to below water with no problems. The V.U.H. was then dispatched on its first location assignment in the Barrier Reef waters off Cairn in North Queensland for the Far North Queensland Promotional Bureau.

The results, according to Telprom Pro-

duction Manager, Peter Bowlay were "very exciting".

"Just Add Water"

The V.U.H. was introduced to the industry through a trade press campaign based on the theme . . . "Just Add Water". It was a perfect example of offering the hardware and then finding practical and original ideas of utilizing it.

The response from the advertising agencies was outstanding as creative directors had another arrow to add to their electronic origination quiver.

Telprom's TK-76B is spending an equal amount of time in the air, on the land and submerged. Recently, it went International when a crew flew to Noumea, in New Caledonia to shoot inserts, on land and underwater, for a new TV spot for Pizza Hut.



This sequence of photos shows the TK-76 camera with its special underwater housing designed by the technical staff of Channel TEN.

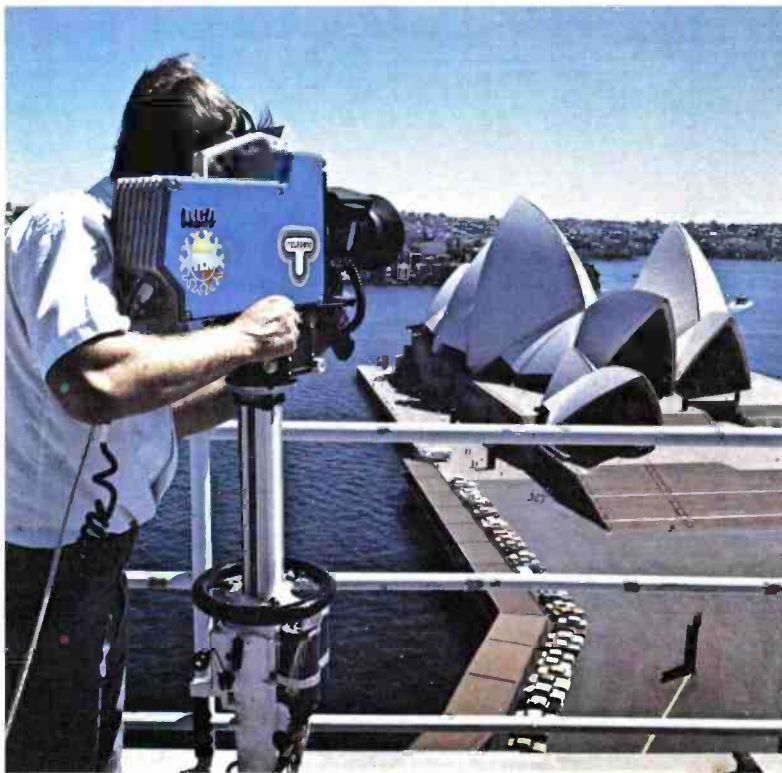


A pair of TK-76's are used for location program production assignments.



One of the "Live Eye" ENG crews sends back an on-the-scene report.

TK-76 camera looks down on a world-famous architectural classic—the Sydney Opera House.



Five More TK-76's

Channel TEN's other TK-76's are also utilized in diverse ways. One is allocated to the Canberra Bureau with the 0/10 Network's political roundsmen, covering Federal politics.

Two TK-76's with remote control are used for location recording of segments for the successful serial, "The Restless Years". The pair of cameras are being utilized alternatively, with one camera shooting a scene, while the other is being set-up for the next scene.

These cameras have had their matrix modified to match TEN's studio cameras, and the results are excellent, according to Chief Engineer Eric Hitchen.

Camera #1001

The fifth TK-76 is a "milestone" camera, with the distinction of being the 1001st delivered by RCA. This camera is used with TEN's Live Eye news vehicle. This unit consists of a Ford transit Van fitted with its own on-board generator with steerable cherry picker microwave system and a portable recorder.

The sixth camera is also allocated to ENG used in the same manner as the old film camera but with much faster, and more reliable results, from the back of a station wagon.

Channel TEN, Sydney—a versatile team using a versatile camera. □

KAET'S

COMPACT MOBILE UNIT

FEATURES

BIG VAN CAPABILITY

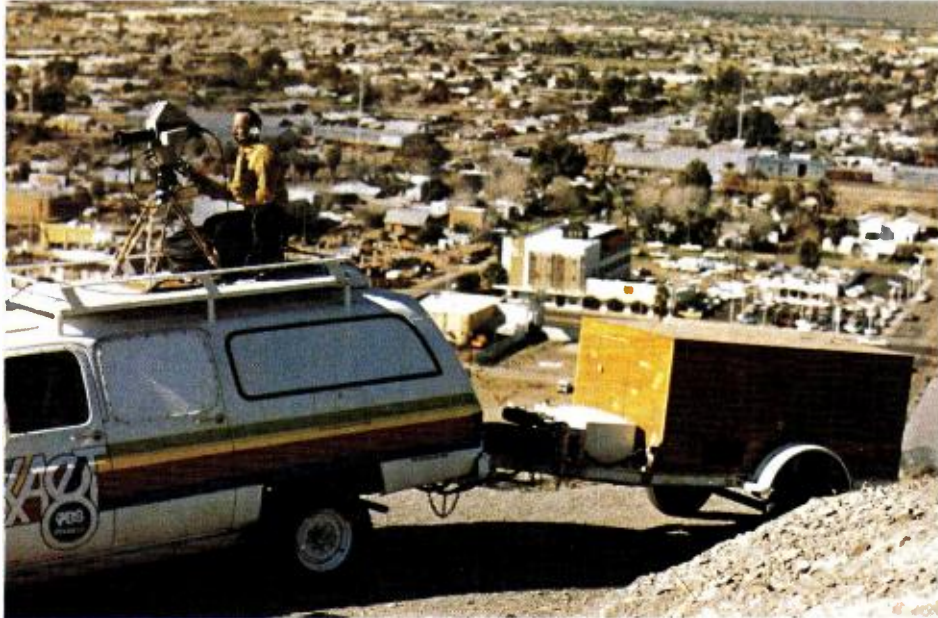
Educational station KAET-TV, Phoenix, needed a new mobile unit—and chose to overcome the apparent handicap of a limited budget.

Meticulous planning in developing detailed design concepts; utilization of available equipment, and generous applications of ingenuity by the KAET technical staff resulted in the remarkably versatile and affordable mobile unit that “does it all” for Channel 8.

The KAET remote unit is quite compact; is designed for utility rather than comfort, but does pack big van capability into a powerful, highly maneuverable package, notes Victor Turner, then Chief Engineer for Ch. 8. (Joseph Manning is now KAET-TV's Chief Engineer.)

Two TKP-45 cameras cover the action “on-the-go” for KAET-TV.





Along with its self-contained complement of equipment, the KAET-TV mobile unit tows a trailer with generator, lighting and additional equipment needed for location shoots.

Design Considerations

"It was designed to be small for three main reasons," Mr. Turner adds. (1) To go about anywhere—from downtown to mountain roads and park in walkways between buildings, backstage at theaters, in a person's backyard and on a mountain jeep trail. (2) To be operated by a small crew. (3) To require minimum set up time and *thus* be able to shoot on many locations per day. We have used more than thirty different locations in one twelve hour day.

"Other important considerations were (1) The ability to use all or part of the truck in studio productions with very little or no fuss. (2) To be able to use studio/EFM cameras on remotes that require more than two TKP-45's, and have camera technical control from the truck. (3) To be able to use additional tape machines and control them from the truck if need be. (4) To use any available power. In this crazy community there seems to be no standard for power. On one location we get 208 three phase, on another (same day) we get 240 single phase. Therefore we have an isolation boost-buck system. (5) The thing had to be able to power itself and several additional cameras and tape machines—for those times that we would be shooting where no power was available.

The generator also needed to be very quiet. We often shoot within fifty feet of the generator."

TKP-45 Cameras Used in Field and Studio

Two or three TKP-45 cameras are used with the mobile unit, as required

for coverage. The cameras are operated from the roof deck and from a special removable front-mount platform. For most assignments, the tripod is used, although the shoulder harness is also available and used for specific production situations. When not needed for remotes, the cameras can be fitted into the studio operation, with technical control switched to the camera control units in the remote vehicle. This flexibility of operation has also permitted greater utilization of the available equipment complement, Mr. Turner notes.

"The TKP-45's have performed well under a range of operating conditions, some far from ideal—such as in the broiling desert sun by day and frequently at low light levels. The scene contrast compression feature of the cameras has been useful to us. Picture quality has been consistently excellent, and the results show in our completed productions."

Remote Unit Fulfills Its Mission

KAET-TV is operated by Arizona State University, with studio facilities in the Communication Arts Building on the University's Tempe campus. The new mobile unit was added to aid the station in fulfilling its mission of developing alternative programming to serve the Phoenix area. It has been equal to the task, Mr. Turner notes.

Assignments have been wide-ranging, testing the versatility of the remote system. Among the major achievements of the mobile unit are:

- National Productions on PBS

Features:

Thieves of Time—A production in cooperation with the Museum of Northern Arizona, this half-hour documentary explores the phenomenon of pothunting, the destruction of Arizona's priceless archeological resources by those who dig up ancient Indian ruins in search of artifacts to sell or collect. Taped on location throughout Arizona, including the Homoloui II and Awatoui ruins on the Hopi reservation.

Sports:

Thunderbird's Phoenix Tennis Classic—One of the Colgate Series tour stops, this \$75,000 purse tournament attracted eight of the world's top ten female players. On this remote the two TKP-45's and two TK-44's were used. KAET's remote truck was tied in with another larger truck, which contained two quad tape machines, camera controls, audio and slo-mo.

Professional Racquetball—On this remote the two TKP-45's and one TK-44 were used. This event marked only the second time that pro racquetball was televised. Because of this, it presented numerous production challenges (audio, lighting, camera, etc.)—truly a pioneering effort for KAET and the truck.

- Local Productions

Features:

On The Town—A monthly showcase of the Phoenix arts scene. Whatever your taste—ballet, rock music, photography, cartoon cinema—*On The Town* shows you where it's happening. Meet the artists, their works and their lifestyles.

Museum Backroom—A pilot program for a series on science designed to introduce young people to fundamental concepts in the various specialties represented at a natural history museum. The program shows what goes on behind the scenes in a museum.

Body Time—A pilot for a series on health, nutrition, exercise and general well-being aimed at youngsters 8-12 years of age.

8's Great Sunday—Live on tape highlights of the awareness event held at Fountain Hills, Arizona. Featured events were the 10,000 meter run, sky divers, hot air ballooning and the world's tallest fountain in action.

Sports:

Extensive coverage of a variety of Arizona sports events.

"Agile" Describes It Best

Vic Turner sums up the attributes, advantages—and the drawbacks—of KAET's remote unit thusly:

"The truck can take two or three TKP-45 cameras just about anywhere a vehicle can go, and shoot under the widest of circumstances and environments. It is difficult to capsule the capability of this unit—it is so compact, powerful, and flexible that it is hard to grasp its possible uses until you have worked with it for a time. Probably the best one-word description is "agile".

"Now it does have definite disadvantages. There is not much room for production personnel—two or three at the most. It was designed for a minimal crew, so extra people must be transported by other means. And it is a work truck, and is not plush, although nicely finished.

"The truck will go places that the chase vehicles will not. It even goes places where it is very hard to walk."

That's *agility*! □



TKP-45 cameras have performed well for CH-8 under a range of operating conditions—some far from ideal.

KAET-TV REMOTE UNIT DESIGN CONCEPTS

1. Small Size—park anywhere.
2. Maneuverable—go anywhere. Mountain roads and desert terrain, cross country, as well as downtown.
3. Powerful—a rough terrain vehicle to climb steep mountain roads; able to move in soft desert dirt; to ford small streams, and to pull itself (fully loaded) with its winch.
4. Self-Contained System.

Power:

Handle any standard voltage, from 110 to 480 V; 17.5 kW generator; isolation boost buck system (allows use of almost any kind of available power).

Video, Audio and Distribution:

Two TKP-45 cameras; two 1-inch helical VTR's; one 2" customized quad VTR; Grass Valley 1200 Switcher, with edging; 12 x 1 routing switcher; audio mixers, mikes and distribution.

Flexible:

Another camera can be plugged into the truck on an external access panel.
Room to permanently mount another camera in the truck.
Additional tape machines can be plugged into the truck via an external access panel.

As self-powered, can drive 10 kW of lights or extra equipment off the generator.

Can plug the whole truck into the studio system with an umbilical from external access panels.

Can operate from about -50° F or more to 115° F. Limitations are the exposed cameras and people.

Very simple to plug anything you need into it—power, cameras, audio, headsets, VTR's, etc.

Very simple to plug it into any other truck or studio—either in whole or part.

Miscellaneous Features:

CB Radio and Mobile Telephone for communications

Two camera platforms

External access to all video and audio lines

External access to power

Standard power breaker system

Switcher removable and plugs in for distances up to 50'

Remote switching monitor system

Truck can transport two-man engineering crew and all necessary equipment for normal shoots

Truck's air conditioning system will allow it to operate up to 115° F in direct sun

The generator is quiet enough to operate within 50 ft. while it is running

Air shocks adjustable from within the truck

C & P Telephone Companies Build A Teleproduction Center On “Grow-As-You-Go” Plan

TK-760 cameras on set at C&P Telephone Audio Visual Center.



Some corporate television systems start small and “grow like Topsy”. A few spring full blown as major operations. Others, like that of the Chesapeake and Potomac Telephone Companies, begin modestly, and grow by plan, establishing a solid track record of performance along the way.

For C & P, the move to television came in 1970, with a basic two-camera monochrome system, one-inch video tape, and a cramped studio in the company’s headquarters building in Washington, D. C.

The system was well utilized and soon plans were being generated for a future upgrading of the facility for color operation. These plans accelerated when Tom Spence joined C & P in 1974 as Public Relations Supervisor (Producer/Director). Mr. Spence came from Ohio Bell Telephone, where he had been part of a team responsible for installing and operating the corporate television system there since 1967. Previously he had an extensive background in film and multi-media operations.

A Major Move and Conversion to Color

In 1976 a major change was made when the CCTV operation moved to its present modern facility in Silver Spring, Md. and changed its name to *Audio Visual Center*. Thereafter, the conversion to color was made, with the installation of quad VTRs, an editing system and three color cameras.

The tape system included two TR-600A machines equipped with built-in AE-600 Time Code Editing systems. A TK-76 camera for field production and two TK-630 studio cameras were also a part of the initial color system. With judicious planning, much of the audio, switching and terminal equipment from the earlier system was utilized for the color facility.



Audio Visual Center for C&P Telephone is a modern, well-equipped facility.



Audio control—8-track audio system provides separate sound and can be interlocked with SMPTE time code to AE-600 tape editing system.

SILVER SPRINGS, MD.

Additional Expansion

Once the color system was in full swing, an on-going expansion program was activated to upgrade and increase the efficiency of the facility. A third TR-600A quad machine was added to meet growing needs. Off-line editing of 3/4-inch tape is now handled from a separate editing room. Audio capability has been improved with the installation of a new sound booth and an audio engineering control room. The control room utilizes two 12 x 2 mix downs and an 8-track audio recorder that can be interlocked with SMPTE time code to the AE-600 system.

And recently, the two TK-630 cameras have been replaced with new TK-760's.

Gene Sansone, Public Relations Supervisor (Chief Engineer) notes that the equipment layout has improved the operating efficiency in producing audio

tapes and post-production editing of the video program because of the flexibility built into the system. In 1979, plans are in motion to add a new production switcher in the studio and a basic switching system in the mobile unit.

Requirement for Broadcast Quality

Frank Just, Staff District Manager, who has overall management responsibility for the Audio Visual Center operation, notes that initially the color system was planned around one-inch tape equipment, using the existing mono-chrome studio. The upgraded color facility with quad tape was decided on for quality reasons, Just adds, particularly since the end video tape product occasionally has to be transferred to 16mm film for distribution.

The mission of the Audio Visual Cen-

ter is to develop and produce a wide range of program material to satisfy information needs of employees and the public, using all AV media. Video is used as much as possible because it has been a most effective medium for the purpose. The present mix of productions, Mr. Spence says, is 83 percent video; 10 percent film and the balance made up of audio and slide/tape productions.

Diverse "Clients" . . .

Diverse Production Needs

C & P Telephone is organized into four companies—C & P of Washington, D. C.; Maryland; Virginia, and West Virginia—each having a state vice-president. The president of the corporation is located at headquarters in Washington. "Clients" for Audio Visual services are all departments or operating units of the C & P Company.



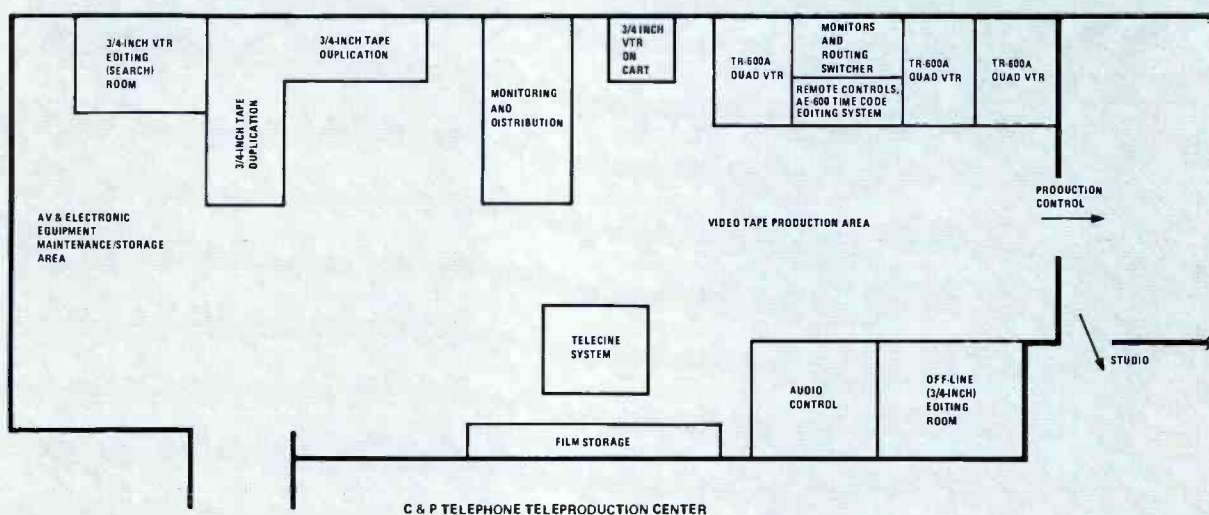
Frank Just, Staff District Manager, has overall management responsibility for the Center.



Tom Spence, Manager of the Audio Visual Center, confers in client viewing room with Tom Mahoney. (Window at rear looks in on studio.)

Gene Sansone, Chief Engineer, has been with the C&P television operation since the first monochrome system was installed in 1970.





Productions run the gamut, from instructional and informative programs aimed at improving communications with employees and enhancing job understanding to training, orientation, new product and service introductions, company news, general and corporate information.

Some productions are developed for use by all four companies, while others

are tailored for just one company or an organization within a specific department, and some are produced for use across the Bell System. During the past year, the AV Center completed ninety-four productions.

Technical Center—A Busy Hub

The Production Control Center at C & P is typical of its counterparts in commercial broadcasting and teleproduc-

Production control center adjoins studio, with complete facilities for audio and video switching; character generator; camera controls; distribution.





From editing console, operator can edit quad tape, insert material from 8-track audio system and all video and film sources.

tion. The space hums with activity and people—clients and AVC staff members. Installation of new equipment and the relocation of existing hardware is an on-going operation which must take place without disrupting the flow of production work.

The main area in the control center houses the quad tape and editing operation; 3/4-inch dubbing; telecine; 3/4-inch tape search room; an off-line editing room and a sound booth. Production control, monitoring, switching and audio facilities are located in an adjoining space. Outside the production control area is the studio itself which occupies an area approximately 40 x 40 sq. ft., with a two-track switchable cyc and two scene lighting capability. A separate high volume, low velocity air conditioning system serves this area.

The Production Control Center is so designed that many separate operations can function simultaneously, such as:

- Quad production recording and editing
- Transferring from 3/4-inch to quad
- Transferring film to tape
- Dubbing videocassettes for distribution
- 3/4-inch off-line editing
- Audio recording

As a rule, cassettes are dubbed in-house when less than twelve copies are required, but are sent out if larger quantities are needed.

The corporate television operation has also been involved in conducting group

conferences involving several locations, permitting one-way video and two-way audio, using push-to-talk telephones. This technique, Mr. Spence notes, is particularly useful for quickly disseminating information about new products/services or other policy matters to large numbers of widely separated personnel.

Quad Tape Editing System

As might be expected, the TR-600A/AE-600 tape facility receives heavy usage. The system is arranged with a dual AE-600 editing remote control panel. At the remote control console, the operator can select any input source

to any one of the three TR-600's and view the quality of the picture on monitors and test equipment. Remote function for controlling the 8-track audio recorder is at the operator's finger tips.

The TR-600A's flank the editing console, two on the right side and one on the left. The VTR on the left is designated for Record, although any of the machines can be used for this purpose. C & P makes frequent use of the A-B roll technique in tape editing. Another feature of the AE-600 which is popular with the Writer/Directors is the "animation" mode which permits making rapid-fire cuts for special effects.

Quad tape editing system includes three TR-600A VTR's with AE-600 Time Code Editing System.



Off-Line Editing

The increased production activity and resultant added load on the quad system necessitated the addition of an off-line editing room. A separate "Search Room" allows Writer/Directors to select rough-cut scenes for final editing on the TR-600A/AE-600 system. For some productions, the complete edit is made on 3/4-inch, using two BVU-200's and a BVE-500A editor.

At present, video production at the AV Center is divided between the studio and the mobile unit. As previously noted, more off-line editing is being accomplished on the 3/4-inch system. As a result, the quad system is free for on-line final edits, thus increasing overall productivity.

During studio production, the time code is added as the show is taped. For field productions, a SMPTE generator has been added to the BVU-100 to automatically add time code to the cassettes. This allows the director to rough-cut his show by reading the time code directly when scene-selecting. The selected scenes are then dubbed to quad, with time code added. From this, a "work" tape is made on 3/4-inch for off-line editing.

TK-760 Studio/Field Cameras

Although the TK-630 cameras have performed well, Mr. Sansone says, the new TK-760's offer far more in versatility and performance. One reason C & P changed over to the TK-760 cameras was the flexibility of convert-

ing from the studio configuration for use in the field. For some EFP applications, the camera will be converted to the TK-76B configuration and used in the mobile unit.

The TK-76 in the mobile unit operates with a 3/4-inch VTR and an audio mixer. In addition to handling complete productions, it is frequently used to provide location footage to supplement studio productions. An AV staff engineer is assigned to the mobile unit when it is used in the field.

A Team Operation

Production assignments originate on a request basis from various "client" operations. After preliminary discussions, a staff Writer/Director is assigned to the project. This Director has full responsibility for carrying it through from inception to completion.

The Audio Visual Center at C & P is a lean operation, organized for efficient utilization of personnel and resources. On Mr. Spence's staff are six Writer/Directors and Mr. Sansone has three engineers reporting to him. The engineers must, of necessity, be versatile, since they handle all phases of the technical operation. Mr. Sansone has been involved in the corporate activity from the beginning, having been responsible for the installation and operation of the monochrome system in 1970; the shift to color in 1976, and the planned new additions.

Each Writer/Director has an average

of three productions in process at any given time. The staff is augmented, as needed, by outside personnel who are employed as on-camera talent as well as for specialized production skills such as lighting, camera operation and other production assistance. This permits using qualified people on a demand basis while maintaining tight control of the creative and production functions. The AV Center team handles writing, directing/producing, post-production, and distribution.

Performance Is Still The Bottom Line

"With the video capability of the AV Center", Frank Just sums up, "we can reach most managers in the C & P companies in a matter of several days, instead of the weeks required for film production. Tape is faster, cheaper and conveys the feeling that 'it's happening now'—which is why video is such a key part of our operation."

Always an enthusiast for TV, Tom Spence sees the color system and the new additions as opportunities to expand the service capability of the AV Center. "We have an excellent studio and in-house video production facility, and with the new equipment there will be more field productions. Now it will be far simpler to go to the clients' locations to take care of their needs."

For the Chesapeake and Potomac Telephone Companies, the solid record of performance in making effective use of television is moving forward—colorfully. □



Writer/Director John Schneider edits tape in off-line editing room.

Mobile unit for the Audio Visual Center looks like a C&P Telephone operations vehicle, but carries a complement of equipment for TV production: TK-76 camera; 3/4-inch VTR; audio; lighting.



WTOG-TV's

New Mobile Unit Is A Production Powerhouse



TV-44's new mobile units in a rare position—parked at the station.

Ever since WTOG-TV went on-air in November 1968, it has been the underdog—the only commercial UHF outlet in a market with three network-affiliated V's. In the fast-growing Tampa/St. Petersburg, Florida market (now #17), TV-44 has fashioned its success pattern by developing and exploiting available resources:

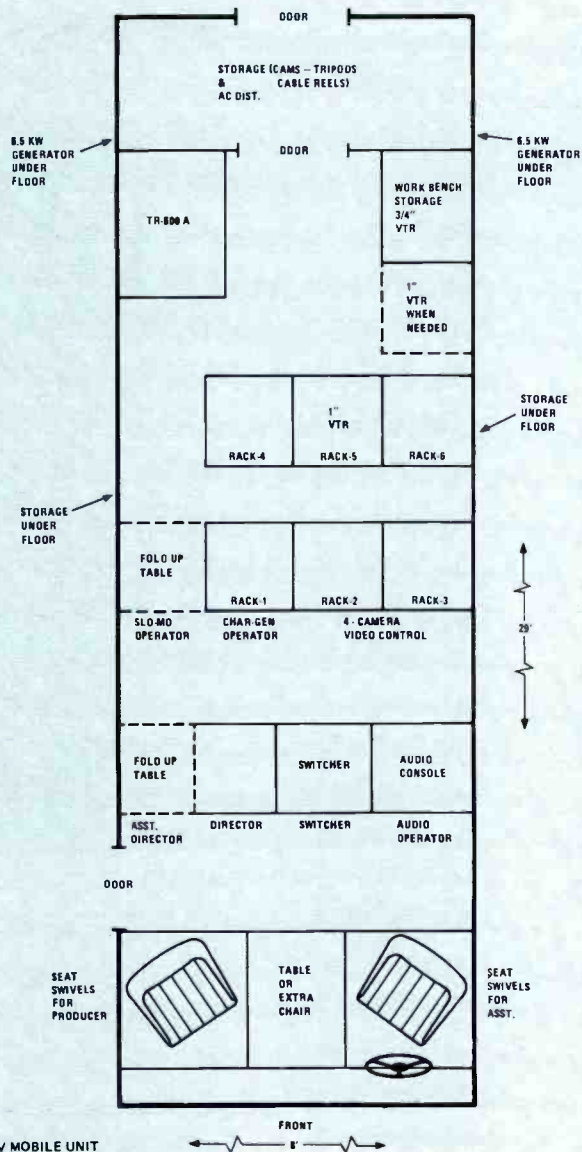
1. *Alternative programming*, with popular syndicated shows, sports and locally-originated programs has provided a solid viewer base, and even

dominance in some key time frames.

2. *Active community involvement*, a hallmark of Hubbard Broadcasting Company (WTOG is a division of Hubbard)—has earned public recognition for the station's contributions.
3. *Technical excellence*. Crisp on-air presentations; quality color — has resulted from the continuing upgrading of facilities from the transmitter to the studio, and has contributed to TV-44's performance record.

In addition to the above combination of ingredients for success, there is yet another area of operations where TV-44 has long excelled, and that is in production capability—inside and outside.

George Orgera, Jr., Chief Engineer at WTOG has used his mobile units effectively for commercial and program production for generating revenue and to complement the studio production facility.



WTQG-TV MOBILE UNIT

Interior of 29-foot mobile unit can accommodate as many as a dozen people. View from driver's seat shows audio and video switching; Director and AD positions in foreground.



Graphics and-video-control operating positions in front of monitor, test and distribution racks.

A Powerful Compact

The newest TV-44 remote truck, activated in May 1978, provides a rare degree of flexibility and capacity in a compact space. An amazing amount of equipment has been fitted into this self-powered 29-foot vehicle, including:

- 3—TK-760 Cameras
- 1—TK-76 Camera
- 1—TR-600A Quad VTR
- 1—1-inch VTR (with space for a second to be added)
- 1—3/4-inch VTR

- 1—Slo-Mo Unit
- Character Generator
- Audio and Video Switching
- 2—6.5 kW Generators

For major events, the vehicle can accommodate as many as twelve people, including operators for VTR; Slo-Mo; Character Generator; Video Control (Camera CCU's); Audio; Video switching—plus positions for a Director, AD; Producer and two assistants.

A full 3-line intercom system with 18

boxes for use inside and outside the vehicle provides ample communications flexibility. Phone jacks are installed for outside telephone line hook-ups.

Two small video switchers were "married" to provide a 2-effects switching capability. This interim system is being replaced by a custom 16-input, 6 bus switcher.

The audio set-up for the unit is unusually powerful, providing 16 microphone inputs, all of which have been used on occasion for special field productions.

Over 200 Remotes

In less than a year, the new TV-44 mobile unit has covered 200 remotes, among them "Wrestling from Florida"; CBS Sports; NBC Sports; Walt Disney Productions; NASL Soccer; Dinah Shore Show; Dick Cavett Show; Can-Am Bowl. "We couldn't handle a schedule like this without the TK-760's," Mr. Orgera says. "For example, in taping two 90-minute Dinah Shore shows, we worked two 12-hour days, operating all of the mobile unit equipment from the generators. During the two-day shoot there were five different 3-camera set-ups each day, one day at Tampa's Busch Gardens, the other at St. Petersburg locations. The portability and ease of set up of the cameras made this fast-moving shooting schedule possible."

"TK-760 Reliability Has Been Fantastic" Remote Supervisor Lynn Hatker is equally enthusiastic about the TK-760's performance. "They're good cameras, and we do everything but pamper them," he remarks. "Color balance is right on the money. On four-camera shoots, all cameras match—even in situations where light changes rapidly such as at sports events that start at dusk, where we change from color filters to clear filters. The cameramen focus on white cards, and that quick they're matched up again. On low light level situations, we switch in the 9 dB gain and get a clean picture with low video noise."

"The portability feature of the cameras is great for remotes. One person carries the camera wherever it has to go for a new set-up."

"Reliability has been fantastic so far. We haven't had to do any maintenance on the cameras for the ten months they have been in operation here. We literally go for weeks without registering—which is a real plus, because with our schedule, downtime would hurt."

Fast, easy set-up makes the TK-760 ideally suited for handling remotes, adds Mr. Hatker. For example, on a four-camera set-up, only six cables are needed from the truck: four for the cameras, one for video monitors, and one for audio. "We have used the TK-760's up to 1,000 feet from the vehicle, and the Automatic Cable Equalization works fine."

TK-76 With Steadicam

Two of TV-44's TK-760 cameras are equipped with Schneider 20:1 lenses and one with an Angenieux 15:1. (The fourth TK-760 planned for the mobile unit will be equipped with a Schneider 30:1 lens, Mr. Orgera said.)

The TK-76 camera now used as the fourth camera in the truck has been operated up to 750 feet from the ve-

hicle with excellent results. A "Steadicam" system provides added flexibility for the TK-76 in production and sports situations.

Criss-Crossing Florida

As an example of the rigorous schedule laid out for the mobile unit, Mr. Orgera cited a recent itinerary. For baseball Spring training, a night game from St. Petersburg was televised and sent North for a sponsoring team. After the game, the TV-44 mobile unit rolled across the state to cover a 1:00 P.M. game from Ft. Lauderdale. Then back again to St. Petersburg for another game. "We would not attempt such a schedule without the TK-760's," George Orgera says.

One of the regular productions is "Wrestling from Florida", with 52 remotes handled by TV-44 on a yearly basis. This show originates in Tampa from a small, non-air-conditioned building where the summer heat builds inside temperatures up to 105 to 110 degrees. The TK-760's operate in this environment without problems, Mr. Orgera reports.

"When the TK-760 cameras were delivered, we took them out of the box,

Flexibility of TV-44 mobile unit with quality performance of TK-760 cameras permits extensive sports coverage.



TV-44's new mobile unit covered 200 remotes in less than a year.



Fast, easy set-up makes the TK-760's ideally suited for handling remotes—Lynn Hatker, TV-44 Remote Supervisor.

hooked them up and they made pictures. They came on a Wednesday, the CCU's were wired into the truck, and we started using them on remotes that Saturday—without having to register them.”

“Same Reliability As The TK-76”

Assistant Chief Engineer John Kays appreciates the lack of maintenance for the TK-760's, which saves manpower in servicing the remote unit. “The TK-760 has the same reliability as the TK-76, and that says a lot,” he remarks.

Two engineering personnel are always with the TV-44 mobile unit, but only Remote Supervisor Hatker is with it on a full time basis. For productions in the Tampa/St. Petersburg area, studio personnel are used to man the mobile unit, while on more distant remotes, free lancers around the state are utilized for cameras, switching and audio. Video tape and video control positions are always handled by TV-44 technicians.

Taping The Action

On remotes, all of the action is recorded on the TR-600A VTR for the client and on the 1" VTR. In addition, the 1-inch or 2-inch VTR can be used for assembling a show “on-the-fly”. For example at football games, the director selects plays as “takes” to be recorded on the 1-inch or 2-inch VTR for viewing at halftime on the post-game show. Slo-Mo action can be edited in.

Quad tapes used on the mobile unit for production are pre-recorded with black and time code, which simplifies making fast insert edits, Mr. Orgera says. The time code from the TR-600A is remoted to a readout in Video Rack #1

so the director can easily identify and select footage for later editing or program assembly.

The Dynamic Tracking accessory has been ordered for the two 1-inch tape machines, which will permit using them as Slo-Mo units for record and playback of action, while the other 20-second Slo-Mo disc recorder can be used as a “still” storage unit, with random access to up to 600 “slides” that can be punched up on demand (such as at a sports event, displaying the still of a particular player who is involved in game action). Each VTR (the quad; two 1-inch, and one Slo-Mo) has its own routing switcher input, allowing the director to isolate on individual cameras or scenes for Slo-Mo record/playback.

Custom-Built Chassis

The basic 29-foot chassis for TV-44's remote truck was custom-built by Barth, a Medford, Indiana, manufacturer of recreation and commercial vehicles. It was built to George Orgera's specifications which called for maximum interior space, a flat floor with no wheel wells and with space under the floor for storage and mounting generators.

The chassis was strengthened to support equipment weight, particularly for the tape machines, and the vehicle is equipped with leveling jacks and spring suspension. Two of the three roof air conditioners are reversible for heating the interior when needed. The interior is square, with paneled walls and 6'6" headroom.

Exterior covered hinged panels are provided for audio, video and power connections.

Two Onan 6.5 kW generators are mounted under the floor of the truck, at the rear, one on each side. One of the generators powers the equipment, while the other handles the three roof air conditioners.

During planning, a three-camera system was called for, with expansion capability to five cameras. During the equipping, a fourth camera, the TK-76, was added. After the vehicle was delivered from Barth, TV-44's technical crew turned to and completed wiring and assembling the empty interior, completing the task in ten days.

TV-44's New Technical Center

The new mobile unit for TV-44 is one more phase in a fast-paced upgrading program. The WTOG building has been expanded, re-arranged and transformed into an attractive, thoroughly coordinated operational layout.

The Technical Center has been moved to the second floor of the building, in a spacious, comfortable environment, with room available for future expansion. Temperature, humidity and air pressure are carefully controlled and computer regulated for efficiency. The low humidity and controlled conditions have greatly improved headwheel life on the tape machines, Mr. Orgera notes.

The large Technical area includes tape, telecine, Master Control, distribution and monitoring facilities. Typical of independent television operations, there is a large complement of equipment and it is well-utilized.

“TCR-100's Still Doing A Terrific Job”

Two TCR-100 video “cart” machines have been in use for over five years, and “they're still doing a terrific job,”



TR-600A rides secure in rear cabin of mobile unit, along with 1-inch and 3/4-inch VTR's and Slo-Mo units.



Master Control On-Air switching console, with tape machines in background.

Mr. Orgera says. The "cart" machines are averaging 450 to 525 plays per day, and the two TCR's have logged nearly a million cycles each. At TV-44, just about everything is dubbed to "cart": film spots; tape commercials; ID's; PSA's; promos. And they're also used as "masters" for dubbing tape copies of quad commercials produced by WTOG.

Four quad VTR's in the center are used for production and program playback. Three of the machines are TR-600A's which are tied in with a Datatron editing system and handle a variety of editing needs: A-B rolls; mix; match edits; dissolve edits. The fourth VTR is a TR-60 which keeps on rolling, and is primarily used for on-air program playback.

The two film islands are each equipped with two TP-66 16mm film projectors and a TP-7 slide projector. One island has a TK-28 camera, while the second has a TK-27 camera plus a monochrome TK-22 which is used for handling inserts.

At TV-44, Master Control is a two-man operation. The Master Control operator handles on-air switching; audio "carts" and loading of film projectors for program or "spots" if necessary. The second operator loads the TCR-100 "cart" machines and other VTR's and handles logging the transmitter remote readings.

Two Production Studios

A large freight elevator at the rear of the Technical Center permits moving equipment in or out as needed.

On the main floor, two studios are in operation. Studio "A" has the permanent News set and another "Living

Area" set for airing the daily 11 A.M. "Suncoast Scene" live program. Studio "B" has three sets operating at a time, including a kitchen. The two TK-44 cameras roll from studio to studio as needed.

Production Control adjoins the studio area and includes a Sarkes Tarzian video switcher, a new 24-input, 4-channel audio board, and the Datatron tape editing system.

The TV-44 engineering staff of nineteen handles all technical operations: Master control; studio; production; mobile units and transmitter.

Mobile Unit Generates Prestige Business

Jim Dowdle, Vice President and General Manager, has been instrumental in bringing TV-44 up to speed and in maintaining the momentum.

"The new mobile unit is a real asset to the station because of its capability, which permits us to handle a full schedule of income-producing outside production work.

"In addition, the high quality level of the mobile unit product continues to generate more prestige business for us from networks, syndicators, and advertisers."

TV-44's Public Service Commitment

The new remote truck also makes it easier for the station to produce public service spots. Mr. Dowdle sees to it that community involvement and public service are serious business for TV-44. In the past year, he notes, the station produced 200 local PSA spots, and was an active participant in numerous community affairs.

Effective alternative programming has

lifted WTOG into a healthy position in the market. Popular syndicated shows like "Mary Tyler Moore", "Bob Newhart", "Dinah Shore", and the upcoming "Happy Days" are attracting a hefty share of their loyal viewers to the station.

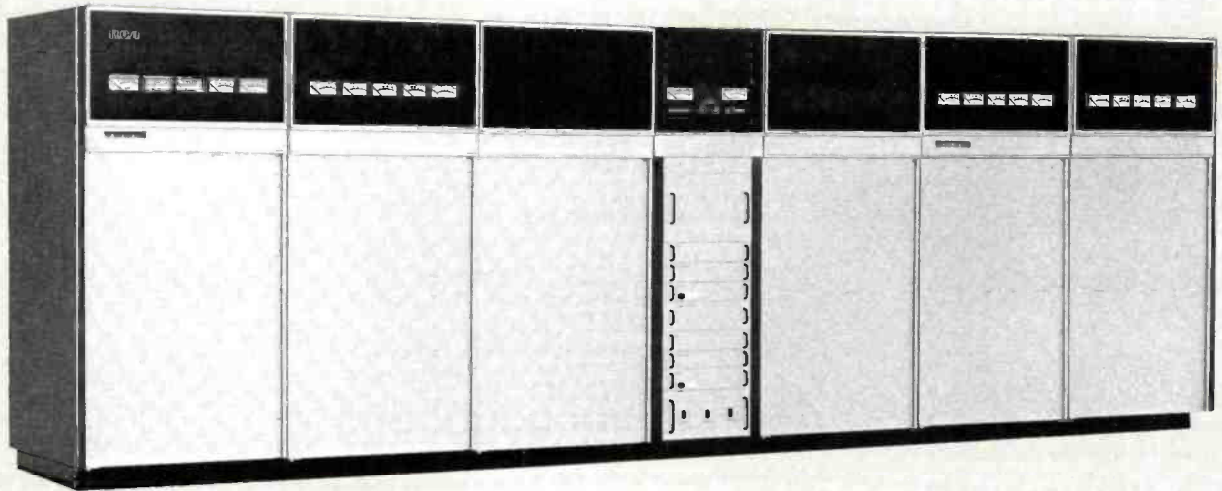
More To Come

With a new technical center in operation and the new mobile unit rolling, Chief Engineer Orgera is actively engaged in new projects to further improve WTOG's technical performance. On the basis of their performance in the mobile unit, there may well be more TK-760 cameras in TV-44's future.

Tape complement at TV-44 includes two TCR-100's for airing commercials and four quad VTR's for production and program playback. TCR-100's are averaging 450 to 525 plays per day.



Products IN THE News



New G-Line Advanced Solid-State VHF Television Transmitters For Worldwide Applications

"TTG" designates a new generation of VHF transmitters from RCA, totally new in concept and featuring the latest in solid-state design technology, to provide a superior picture and higher levels of reliability.

New developments in electronic design permit the use of only two tubes in the entire transmitter, one visual and one aural. The elimination of tube amplifier stages, with all circuitry being solid-state up to the 1600-watt visual and 100-watt aural driver output power levels, minimizes the need for attention and maintenance. The broadband techniques used in the new transmitters eliminate all tuning requirements except for the final stage.

Worldwide Standards

The new "G-Line" transmitters are designed for operation on worldwide color broadcast standards, including NTSC, SECAM, PAL-B and PAL-M, meeting requirements for essentially all bandwidths and channel assignments.

For all requirements, a universal crystal oscillator, combined with a unique frequency synthesizer, accommodates any channel or frequency offset. Both aural and visual frequencies are controlled by the same crystal.

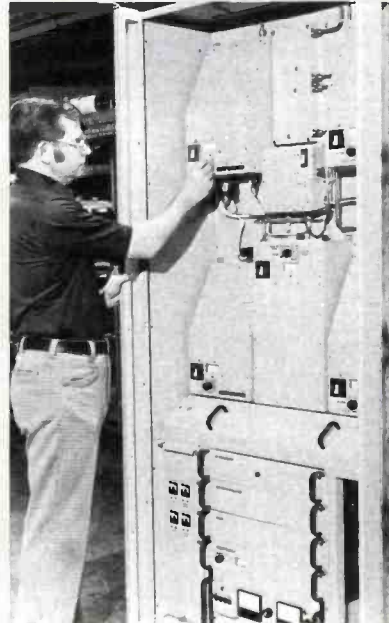
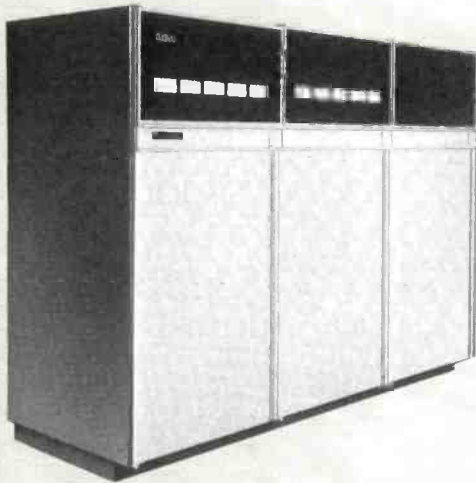
A broad range of power classifications, system configurations and broadcast standards are available with the "TTG" Series, with a choice of 20 transmitter models, each specifically suited to individual requirements.

The transmitters in the "TTG" Series are designed to operate conservatively up to power levels 20% greater than previous designs. Single-ended low-

band and highband transmitters are offered in a range of power levels up to 30-kilowatts of visual power and 6.6-kW aural power output.

Dual transmitters, with two units in parallel, operate at power levels up to 60-kilowatts visual and 13.2-kW aural power output.

The single transmitter is made up of three compact cabinets: the exciter/driver; the power amplifier; and the power supply—interconnected for the most part by factory tested, plug-terminated cables. For parallel configurations, a combining cabinet, housing the two exciter-modulators, joins the two single systems. The combining unit also provides isolation between the transmitters, so each operates independently for greater on-air reliability. Regardless of operating configurations, optimum linearity correction is maintained by circuits dedicated to each RF amplifier system.



RCA technician checks one of the all-solid-state, power amplifiers in the new TTG television transmitter. Four of the amplifiers produce 1600 watts of visual power drive capability, with no tubes and no tuning required.

Extensive Safety Features

New and extensive personnel safety features have been designed into the new transmitter. A key operated interlock system is provided so that all high voltage has been eliminated before gaining access to tubes and cavities, with additional protection from high voltage provided by electrical interlocks. No high voltage wiring is external to the cabinets, and no DC voltages in excess of 46 volts are present in the entire driver cabinet.

New Techniques in TV Transmitters

Broadband microstrip circuitry is one of the electronic design advances incorporated in the new solid state RF amplifiers used in the new "TTG" transmitters. This technique results in precise control of the signal path and improved reliability through elimination of leads and connectors.

A "heat pipe" cooling system transfers heat from the power amplifier transis-

tors to a heat sink, and allows the high level of solid-state design used in the new transmitter line. This unique closed cooling system is built into each visual IPA amplifier module.

"Soft" Turn-On

A solid-state power controller replaces mechanical high voltage contactors, providing fast, controlled application of plate voltage to the power amplifier tubes and improved overload protection due to a faster tripoff. This soft turn-on eliminates high-voltage stress on tubes and other components.

Numerous "Automatics"

An automatic solid-state control system stabilizes visual peak power and aural power output levels, and prevents power output variations due to line voltage fluctuations, power line and power supply regulation, and other factors.

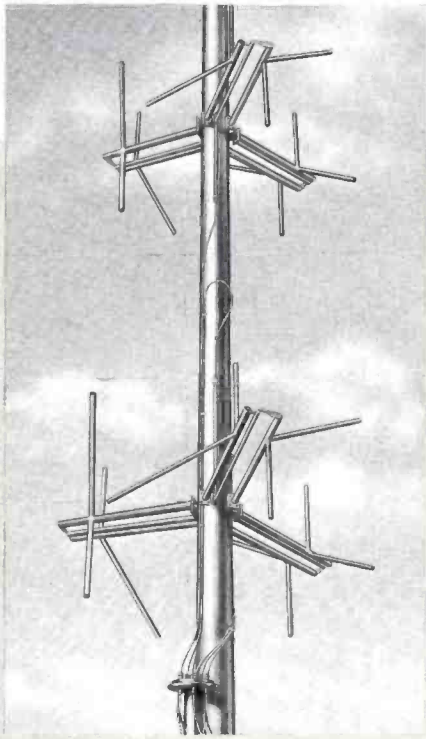
Another automatic system reduces

power in the event of a deteriorating load VSWR such as antenna icing conditions. The transmitter power output is reduced at a controlled, monitored rate, allowing the station to stay on the air at a safe power level.

In the event of a power interruption of up to ten seconds, automatics in the transmitter are designed to get the unit back on the air within two seconds of power restoration. For interruptions of more than ten seconds, the transmitter can be back on-air within four seconds of power resumption, by manually by-passing the normal time delay of two minutes.

The new line of transmitters use RCA's unique Surface Acoustic Wave (SAW) filter, temperature controlled for optimum performance under all operating conditions.

Catalog TT.1000 provides comprehensive descriptive data on G-line VHF transmitters.



Two New Circularly Polarized TV Broadcast Antennas

A new low-windload circularly polarized TV antenna for VHF channels 2-6 and a new slanted slot pylon circularly polarized antenna for UHF Channels 14 through 70 have been added to the RCA antenna product line.

Dual Mode TDM

The new dual-mode VHF antenna, Type TDM, is designed for tower-top mounting. The antenna's design results in windload characteristics which permit it to directly replace an existing six-bay horizontally polarized Supersun-style antenna.

The TDM consists of seven layers, each containing three radiators mounted symmetrically around the pole. Each of these twenty-one radiators produces both horizontally and vertically polarized signals. The antenna produces a power gain of three in each polarization.

Each layer of the antenna produces

omnidirectional horizontal patterns of both components, and a very low axial ratio of circularly polarized radiation in all azimuthal directions.

TFU-CP for UHF

The new UHF antenna, designated the TFU-CP, is designed to replace the RCA horizontally polarized pylon antenna, where circularly polarized applications are desired. The antenna design permits direct mechanical replacement of most existing horizontally polarized UHF pylons.

The new circularly polarized pylon antenna uses the hardware and techniques of the RCA UHF pylon and the RCA VHF traveling wave antennas, achieving circular polarization by slanting successive layers of slots along the antenna.

Excellent horizontal and vertical patterns are maintained in the circularly polarized pylon with a very low axial ratio of circularly polarized radiation in all azimuthal directions.



Audio Product Additions

New additions to RCA's line of audio equipment for broadcast and production applications include:

Two new series of Audio Consoles.

BC-500 series consoles are configured from a wide variety of module types and can be custom-built to meet specific requirements of broadcasters and recording studios. BC-300 series consoles are designed primarily for demanding, but less sophisticated applications. The six, eight and ten-fader dual channel stereo consoles in the series have four inputs per mixer. The consoles also include programmable remote start, programmable peak LED indicators, and programmable monitor muting.

Audio Cartridge System.

The RT-128 is a new triple deck system designed for monaural or stereo applications. The deck accepts standard NAB "A" or "B" cartridges. Two of the decks are equipped for playback only operation, and the third deck can be optionally equipped with a record amplifier accessory for full record capabilities.

Servo-driven Turntable.

BQ-52 is a high performance turntable for broadcast and production use. It features a precise DC servo drive motor and variable speed, with digital readout of the turntable rpm. The high torque of the unit allows fast platter start-up, and makes it easy to slip cue. Back-cueing also is possible, since the platter can be disengaged from the drive mechanism.

New 16mm Film System Features Unique Operational Talents

More than a projector, the new FR-16 is a 16mm film handling system with features uniquely suited to specialized teleproduction and broadcast telecine applications.

Designed and built by RCA Photophone Systems, Burbank, Calif., the FR-16 projector offers operational capabilities which have only been available in 35mm telecine equipment.

The new telecine unit features an incremental 16mm film handling system designed for presenting an illuminated film frame to a telecine camera. Its design and packaging provide for gentle film handling, quiet operation, easy loading and uncomplicated operation.

"Instant" Stop/Start

A servo controlled film drive mechanism functions as a film drive station using a low-inertia DC servo motor with a large diameter sprocket.

The "instant" start/stop capability of

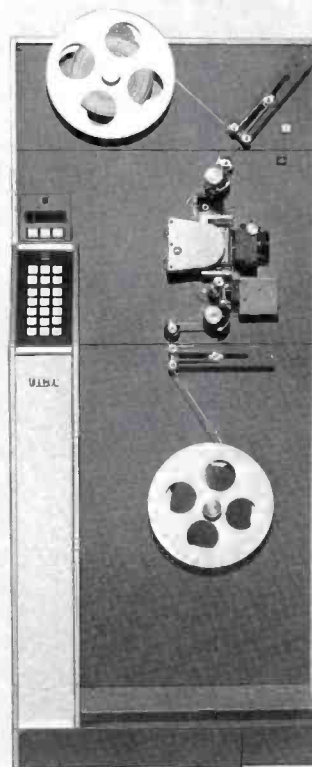
the new film system is essential for many special cine effects and editing applications. Start, from zero to cine speed (24 or 25 frames per second), occurs in less than five film frames. Stop occurs in less than one film frame. A smooth stop-reverse-start sequence, as a special effect, occurs in less than one-half second.

Variable Speed Operation

The FR-16's speed can be variably adjusted at an incremental film rate from 0 to 48 frames per second, in either the forward or reverse mode. This capability provides an additional post-production tool for special effects, repositioning of program material and editing.

In the freeze frame (still) mode, the application of light remains the same as when the projector is operating, with no degradation of the picture.

The FR-16 can be locked to an incoming power line (50 or 60 cycle) and will operate at 24 or 25 frames per second. For telecine operations, the system can be locked or referenced to TV vertical sync for high quality color TV operation.



New TH-200 Series VTR With Previewable Editing And Dynamic Tracking

Among the new features of the TH-200 one-inch helical scan studio VTR which enhance its versatility are: previewable automatic editing, optional "dynamic tracking" for broadcastable variable-motion and still pictures, and simultaneous "confidence" playback during video record.

The "dynamic tracking" accessory makes possible noise-free playback of video over a wide range of tape speeds, from 1/5-speed in reverse to two-times normal speed in forward, including still pictures. With "dynamic tracking" the stability of the playback video is maintained even during speed changes.

Built-In Editing Facilities

The compact TH-200 recorder includes built-in capability for both manual and automatic editing. The new editing function provides for automatic preview, editing and review of each edited segment, operated from the recorder's control panel.

In a preview mode, the auto editing function prerolls the video tape to the selected edit point, displays the edit on a monitor, and stops the tape at the edit out point. Frame-by-frame "trim" modifications of the in and out edit points also are possible. After preview, the actual edit can be made and

reviewed automatically.

The TH-200 also provides manual editing functions for both assembly and insert editing. A single control dial permits bi-directional search in two different search modes. In the normal shuttle mode, the control dial permits smooth variation of the tape shuttle speed in both forward and reverse. In the jog mode, the control dial has the ability to position the tape reels as if by hand.

Confidence Head

The new recorder also features simultaneous playback of both video and sync channels to permit monitoring of materials while recording. Simultaneous playback is accomplished by a "confidence" head, indicating to the operator that video and sync channel integrity are being maintained during recording.

New Digital TBC

Also added to the helical scan product group is a digital time base corrector, the TBC-200. This multi-function system provides improved picture quality as a result of numerous standard features, including 4 x subcarrier sampling; 9-bit quantization; 12 Horizontal line correction window, and line-by-line drop-out compensation and velocity error correction. Recognizable pictures are also retained at shuttle speeds of up to seventy times normal.



RCA Camera News

Five new product advancements in the RCA camera line were introduced at the 1979 NAB. These are:

1. Lightweight TK-76C Portable
2. Comet tail suppression
3. Expanded remote control capability
4. Triax
5. Reduced-width blanking

TK-76C The New Heavy-Duty Lightweight

TK-76C designates the latest, lightest version of this popular ENG/EFP camera, weighing less than fourteen pounds. A retrofit kit will be available

to convert existing TK-76B models to the new lighter weight version.

CTS Added to TK-76 and TK-760 Cameras

Comet Tail Suppression (CTS), another feature to enhance camera performance, is now being added to new TK-76 and TK-760 cameras. The "CTS" system suppresses comet tail without requiring a special tube or degrading tube life.

Expanded Remote Control

Capability of the multi-core cable remote control system for TK-76 and TK-760 cameras has been expanded to permit operation with cable lengths to 3,000 feet, with automatic timing and equalization.

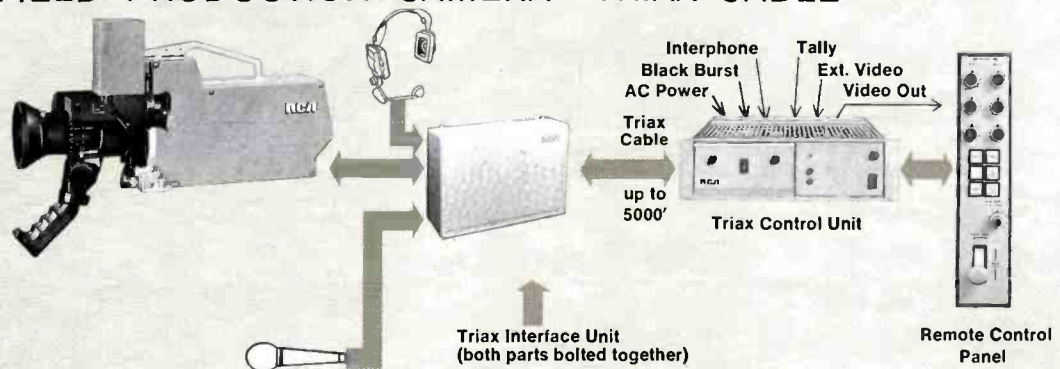
New Triax System

A new Triax method of remote control for the TK-76B and TK-760 allows these cameras to operate over any standard Triax cable, at lengths up to 5,000 feet. The new system is adaptable to a wireless configuration, with a portable microwave unit replacing the cable.

Adjustable Blanking

Narrow, adjustable blanking has been added to TK-76 and TK-760 cameras now in production. The reduced-width horizontal and vertical blanking capabilities will allow teleproducers to prepare programs meeting the industry's tightest specifications.

FIELD PRODUCTION CAMERA - TRIAX CABLE



THE REMARKABLE NEW G-LINE TRANSMITTER. A GIANT STEP FOR TELEVISION BROADCASTING.

RCA introduces the first major advance in television transmission in more than a decade: The new G-line.

Revolutionary. With the highest level of solid-state, the fewest tubes, the most advanced automatics.

It offers so much more than conventional transmitters: in engineering, high performance, and long-range cost-effectiveness.

Solid state to a new high of 1600 watts. One-stage tuning. Advanced automatics and safety features.

Day in day out, the G-line is built to cost less.

With only two tubes throughout: one visual, one aural. That means a reduction in spare tube inventory.

With one-stage tuning: amplifier tuning is needed only in the high-power output stage, not in the solid-state broadband driver.

And with real self-sufficiency: the G-line paces its performance, overcoming variables that affect stability. After a momentary power line interruption, it returns to the air in two seconds automatically.

The G-line is designed to meet future safety demands, with a key interlock system plus electrical interlocks to assure a new higher level of protection for your people.

Everything about the G-line is

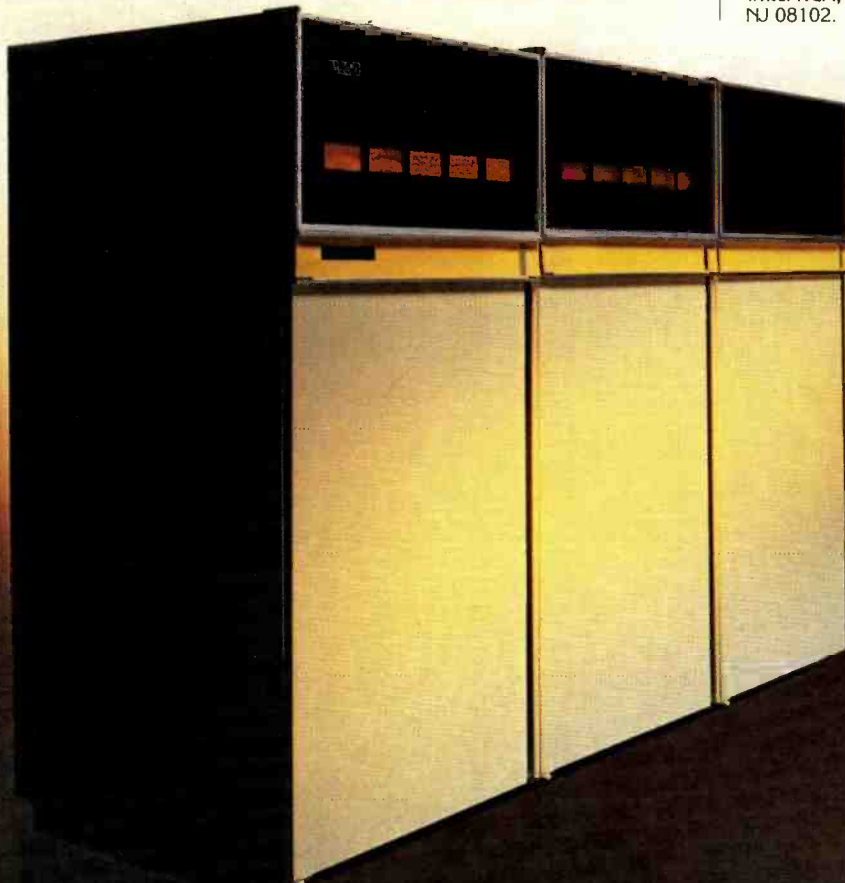
geared toward higher performance that saves you time and manpower—that's RCA cost-effectiveness.

The G-line is new in design, new in versatility.

The G-line transmitter also offers great versatility: eight new power levels with 20 model variations, and visual power output of up to 30 kW (60 kW parallel).

It's the newest member of the RCA family of television broadcasting equipment: everything from cameras, to film chains, to antennas. All backed by famous RCA TechAlert service and parts support.

See your RCA representative or write: RCA, Building 2-2, Camden, NJ 08102.



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Before others were
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