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ULTRA MODERN VIDEO CONTROL AT WOR-TV... N.Y.C.

ULTRA-MODERN WOR-TV Is 84th Television Station

New York's newest television station incorporates many interesting equipment and studio features.

By

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WOR-TV Video Facilities Engr.

WOR-TV, Channel 9, which has just gone on the air in New York, is the final station authorized for that area under present FCC/v.h.f. allocations.

But WOR engineers have literally been in television ever since the new medium was first developed. They have kept abreast of the progress of the industry, watched new methods and equipment replace old. When WOR was granted a construction permit for WOR-TV, the engineering staff knew from their own experience, and from the good and bad experiences of engineers at other stations, exactly what camera pick-up and transmitting equipment would best enable them to build the most modern TV station in the area.

They chose their equipment from what they considered the best offered

by the three leading manufacturers. This article will discuss the function and type of equipment used in each of three locations—the WOR-TV transmitter, studios, and mobile units.

A 760-foot, self-supporting tower holds WOR-TV's 50-foot transmitting antenna high in the air. The antenna is a six-bay superturnstile that radiates both audio and video carriers. The tower and antenna are located on the Palisades of New Jersey overlooking Manhattan, 240 feet above the Hudson River. Thus the combined height of the tower and antenna is 1050 feet above sea level.

Also located atop the tower is an FM antenna—a GE "doughnut" model, a special form of folded dipole. Because it is the belief of the station that both AM and FM radio will continue to co-exist with TV for some time to come, it was decided to integrate FM transmitting facilities with the TV installation. AM broadcasting facilities—without the problems of propagation affecting FM and TV—are satisfactorily supplied by WOR's existing

WOR-TV's audience studio theater. In adapting the theater for television use, the orchestra pit was covered and three camera ramps added to the stage at the theater.



WOR's television transmitting tower located in North Bergen, N. J. 760 feet high, the tower is the tallest structure in the state. It stands 1050 feet above the Hudson River on the Palisades. From the 50-foot antenna, WOR-TV began operation on a 20-hour-a-week schedule on October 11th, telecasting on Channel 9.



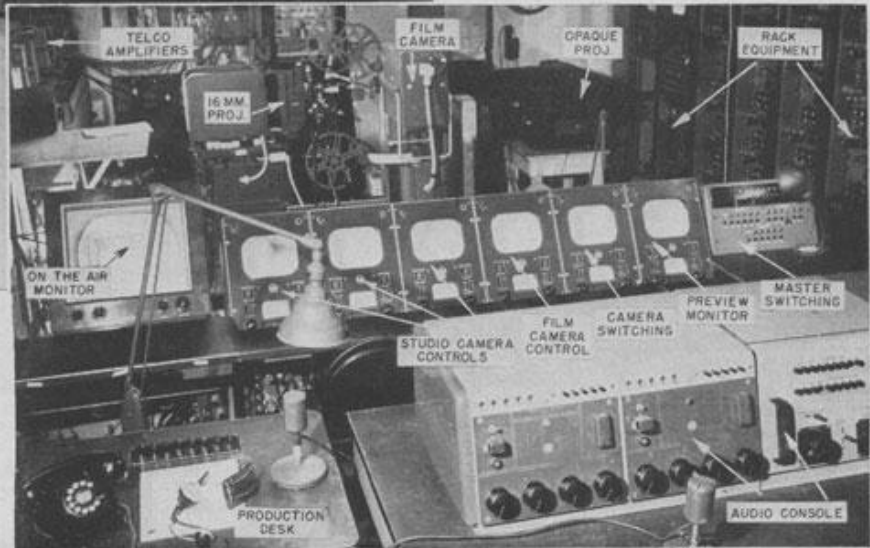
← Close-up of transmitter control console (left) and video console (right, center). The turntable in foreground belongs to sound desk. The video mixing desk operator faces the TV and audio racks which line wall behind the console in right center. Instruments enable operators to set and maintain proper audio and video levels of the signals feeding into the transmitter unit.

↓ A studio control room at the New Amsterdam Roof Theater with the temporary master control switching setup now being used.

transmitter in Carteret, New Jersey. FM and TV antennas are both equipped with heating devices to prevent formation of ice in the winter. This is important, since icing would change their transmission characteristics.

Located at the WOR-TV transmitter site, in addition to the television transmitter, are input video equipment for monitoring and handling incoming signals from the master control in the city, a microwave receiving terminal, and also a local source of video for generating the test pattern and transmitting slides.

The WOR-TV transmitter building has been designed for efficient operation. When seated at the transmitter control desk the operator on duty faces the transmitter unit, the racks of which line the walls at the right of the picture on this page. Both the sound desk and the camera control and mixer desks are easily available to him. Normally, however, the programs are originated elsewhere and routed to the transmitter via a master control point.



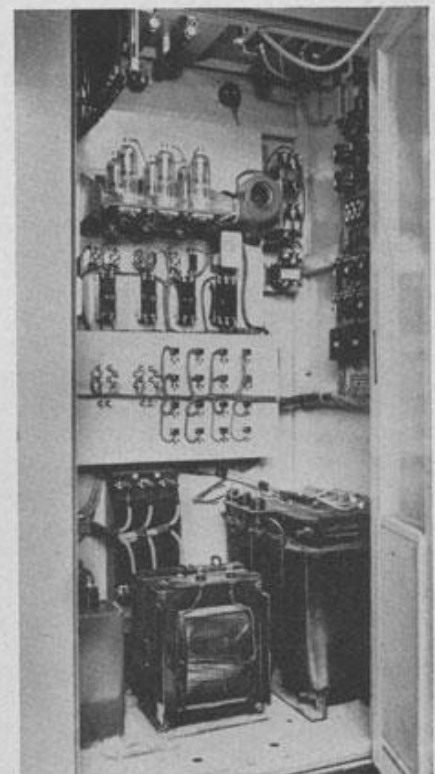
The master control was first located in WOR-TV studios in the New Amsterdam Roof Theater in New York. When studio facilities are completed in the Television Center at 67th Street in Manhattan, the master control will be located there.

The WOR-TV transmitter is a *General Electric* type TT6D rated at 5 kw. peak video power and 2.5 kw. aural power. Because of the present FCC 50 kw. e.r.p. (effective radiated power) limit, only 2.04 kw. is fed into the transmission lines.

The FM transmitter is a 10 kw. *GE* BT-4-B model.

At this writing WOR-TV is originating its television programs from two studios and two associated control booths in the New Amsterdam Roof
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Passageway behind the FM and TV transmitter racks. Nearest racks house the television transmitter with diplexer mounted above. The other racks contain the FM transmitter. In the left foreground is the dummy antenna while above it are the dehydrators for automatically pressurizing the transmission lines. Racks in background contain telephone terminal equipment (audio and video) and test and measuring equipment.



Interior view of power cubicle of FM transmitter showing rectifiers and transformers.

Ultra-Modern WOR-TV

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Theater. One studio is arranged for audience attendance and participation. The existing theater facilities in the New Amsterdam were adapted for television purposes as follows: one control booth was built under the orchestra in a space formerly used for storage, and the other was set up in a former projection booth.

The stage itself was adapted for television purposes by the addition of three ramps and the extension of the apron. The ramps extend radially from the stage at either end and from the middle. They allow the cameras great flexibility and freedom to dolly in and back.

A second studio, comprising three basic sets, was constructed in a portion of the theater's original balcony. The control room for these sets is located in the former projection booth.

Each studio is planned for three-camera operation, and each studio control room equipped accordingly. The cameras are RCA TK-10A models using the type 5820 image orthicon tubes.

Control room monitors, the synchronizing generators, and the stabilizing and distribution amplifiers are of the latest RCA design.

At the time of writing the larger of the two control rooms is also being used as a master control point until the permanent master control can be completed in WOR-TV's new studios in the "Television Center" on 67th Street, New York.

Facilities there include a master control room, a projection room, three studio control rooms, two large studios, and two announcing studios. Each of the three studio control rooms are identical, as regards facilities. Two of these control rooms face on corresponding studios.

Among the novel features incorporated in the 67th Street setup is the removal of all video operating personnel from the studio control rooms. This is done in order to minimize the number of people present in the control room during the actual production of programs. Located here is a program console, in which are mounted seven picture monitor tubes. Four of these monitors are used on the individual cameras for that studio.

Two may be switched for previewing incoming remote signals or film inserts, which may be a part of the studio show, and the seventh monitor is used as an outgoing line monitor for that particular studio.

The production man and a video switching engineer are seated at the control desk in front of the monitors. To the right of the video console is located an audio control console at which one audio man operates. Thus, the total personnel in the control room is reduced to three for producing a television show.

The video operators who set video and background levels on the individual cameras for all studios are located in what is called the "camera control center," a part of the master control room. Here, all of the camera control units with their picture monitors and oscillographs are centrally located for all studios in one console unit. The video operators at this point are in communication by wire with the directors and camera operators themselves. Their only function is to see that the cameras are electrically focused, and that the levels on the oscillographs are properly held. This system has a further advantage in that a video operator operating in one studio can quickly switch over to the control units of another studio, thus further minimizing the personnel requirements for the station.

Another feature of this system is a camera cable patch panel, located in the camera control center, which enables the quick patching of any one of the eight studio cameras' camera controls into any of 15 camera outlets in the two studios or "announce" booths when required.

For example, if it were desired to augment the four cameras in Studio A for a particular show with a fifth camera from Studio B, it is merely necessary to plug in the fifth camera control in the camera control center into the cable leading to Studio A, and the same video operator in the camera control center will have this control unit at his fingertips.

The two large "announce" studios are equipped with camera cable feeds to the camera control center, so that if a single camera shot of an interview or a news program is desired, it is merely necessary to patch in one of the eight camera controls to the "announce" booth cable.

The projection room adjacent to the master control room is equipped with four TK-20A film camera chains. Each film camera is fed by means of a multiplexer with several sources of slides or film. Included in these facilities are 35 mm. projectors, 16 mm. projectors, 2 x 2 slide projectors, and opaque projectors.

The film camera control units, with their monitors and oscillographs, are centrally located with the studio camera units in the camera control center. This further simplifies the operation in several ways.

The program control for the film equipment is located in the Studio C control room and is identical with each of the two live-talent studio control rooms. This control room enables the production personnel to put on an all-film program or to handle film inserts in a remote show.

The video switching system for each studio control room handles a total of twelve inputs. The switching is actually done by relays in the master control room, but controlled from the individual studio control rooms. This gives considerable flexibility to the switching of cameras between studios

and the handling of remotes in individual studio control rooms. Five banks of video switching relays are used with each studio switching system. One of these gives an output for the main program to the master control. Two other relays are used to switch the two preview monitors to any of the twelve inputs, as desired. Two other outputs are provided to feed a mixer amplifier for "super positions," "lap dissolves," and any other special effects which may be required in the future.

The twelve inputs are set up normally so that eight inputs are camera signals, that is, video and blanking only, three for composite signals, such as incoming remotes, and one the "effects" input to the program output.

The master control switching facilities also present a novel system, at this time. The system is designed for six composite video inputs and six audio inputs, with four outgoing channels. The system provides for pre-setting on both audio and video signals with either simultaneous audio-video switching or separate audio and video switching. Two of the standard RCA console sections are used for each outgoing channel. One of these sections houses a TM-5A master monitor with picture tube and oscillograph, while the adjacent section houses the preset control buttons and tally lights. A master "trip" button appears on each of the four channel sections, enabling the operator to trip all four outgoing channels when required. A "local" or "master" control switch on each of the sections also enables the operator to set up an individual channel for separate control when so desired. The system is extremely flexible, and it is anticipated that it will fulfill all of the requirements for television master control switching in the near future.

Mobile Units

Approximately half of all WOR-TV programming is remote, and fed to the transmitter from WOR-TV mobile units. These were made to order according to WOR-TV engineering specifications. Each unit contains a three-camera setup with associated sync generators and monitors.

Maintenance of these mobile units and their equipment is especially important since so much of the station's program schedule depends on their smooth and accurate functioning.

The signal from any remote pick-up can be beamed to the 550-foot level of WOR-TV's New Jersey transmitter. A microwave relay house at that level picks up the signal and feeds it directly to the transmitting equipment below. When required, it can be routed to the master control in the city for switching.

In the over-all planning of WOR-TV's technical facilities, the emphasis has been placed on obtaining flexibility and ease of operation to insure smoother and better programming on the air.