RCA

TUBE TIPS

A NEWSLETTER TO THE BROADCASTING INDUSTRY

RCA TUBE DIVISION HARRISON, N. J.

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Here They Come! RCA Tubes for Color TV Service

Now that the Federal Communications Commission has approved the standards used by the Radio Corporation of America's compatible color television system, broadcasters across the nation are looking to RCA for continued leadership in the development and production of top-quality tubes for color application.

Two of the tubes currently under development by RCA which are of tremendous interest to broadcasters are a single tube that will do the job of the three color pickup tubes used in the present-day compatible color TV camera, and a 19-inch shadow-mask tricolor kinescope with nearly double the picture area of the commercial RCA 15-inch tricolor picture tube, yet having the same brightness.

Among the commercial tubes already in the RCA line which are applicable to the special needs of color TV are the 1854 image orthicon, the 6181 UHF power tetrode, and the 6166 VHF power tetrode, as well as the recently announced 15GP22 tricolor kinescope – heart of compatible color TV – and five associated receiving tube types: 6AN8, 6BD4, 3A3, 6BY6, and 6AU4-GT.

UNDER DEVELOPMENT

RCA's development of a single, compact, and simple tube that will do the job of the three color pickup tubes used in present-day compatible color TV cameras was revealed on January 27th by Dr. E. W. Engstrom, Executive Vice President in charge of the RCA Laboratories Division. Substantial progress is being made, he said.

"We demonstrated a laboratory model of the single-tube color camera in 1953, at the David Sarnoff Research Center of RCA at Princeton, N.J. Since then we have succeeded in increasing the sensitivity and the quality of the picture," Dr. Engstrom pointed out.

He continued: "We have explored various methods of color television pickup and found the single-tube, all-electronic camera to be superior in principle to all other known types. We have sought to create a color camera that will enable direct pickup with a single tube that does not require coding and decoding from an incompatible to a compatible system. Our new single pickup tube achieves this result. Also, it is simple, flexible, and rugged. While the new tube is still undergoing development, the progress already made assures its ultimate availability for commercial use. The new color camera tube operates on the standards approved by the FCC.

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RCA's newest contributions to color television will highlight the company's exhibit at the 1954 Radio Engineering Show, March 22-25, to be held in the Kingsbridge Armory, New York City. Visit booths 151-153 on Television Ave.

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"This new single camera tube promises to reduce substantially the size as well as the cost of television color cameras and the apparatus associated with them. When commercially produced, it is expected that the new one-tube cameras will replace all other presently known methods of picking up color television programs both in studios and outdoors."

Advance information on design and production of the developmental RCA 19-inch tricolor kinescope was made available on January 21st to RCA tube licensees at a technical symposium held at RCA's David Sarnoff Research Center, Princeton. This picture tube is expected to be commercially available in limited quantity in the latter half of 1954.

Tracing RCA's pioneering development of the shadow-mask tricolor tube, E. C .Anderson, Vice President in Charge of the RCA Commercial Department, stated:

"The need for larger color pictures has been known from the beginning, and all our plans have been made with that in mind. This factor was very important in our decision to proceed with the 15-inch tube. Many designs of tubes can be promoted from drawings or laboratory models, but the real test comes in the factory and in the home.

"The 15-inch shadow-mask tricolor tube is now in production in our Lancaster, Pa., plant. We understand that other companies are also producing this type and size of tube. This same type of tube in the 19-inch size uses many of the parts, materials, processing equipment, and associated components of the 15-inch tube now in production. Important modifications have been made to achieve good performance in the larger size."

The developmental 19-inch tube has a picture area of 162 square inches.

RCA scientists and engineers have achieved the same brightness and clearness with the 19- inch tricolor tube as are now obtained with the 15-inch tube. Three major developments in the larger tube are: a new electron gun assembly; improved phosphors; and a shadow mask of modified design. The deflection angle of the electron beams has been increased to allow for the fact that the larger tube's length is not more than the length of the smaller model.

Explaining that the 19-inch tube, like its predecessor, is an interim model, Mr. Anderson told the tube manufacturers that RCA is continuing research and development work on other types and sizes of tubes for color receivers.

"Approximately eight months ago, we demonstrated in these laboratories a color tube – in the research stage – producing a much brighter picture," he said. "That tube employed principles differing from those in the current shadow-mask tricolor kinescope. We are pressing forward in our research work on that brighter tube as well as on the other color tubes under development. We are pleased with the progress we are making and we hope that one of these color tubes – the focus-mask type – will be brought by us to a commercial production stage next year. This new color tube will be larger – 21 inches, for example – and rectangular in shape. It will produce a very much brighter picture than any presently known color tube. This new tube and its particular circuits will meet the practical requirements of a color receiver."

COMMERCIAL TYPES

RCA-1854 is the only commercial pickup tube with the high sensitivity needed for the color TV camera. (For technical details on this image orthicon for color TV, consult the article, "Image Orthicons for Color Cameras," which appears on page 161 of the January, 1954, issue of *Proceedings of the IRE*, published by the Institute of Radio Engineers, Inc. This article is authored by RCA Tube Division engineers R. G. Neuhauser, A. A. Rotow, and F. S. Veith.)

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RCA-6181 is a forced-air-cooled UHF power tetrode for TV transmitter service. It is rated for operation up to 900 Mc, and can deliver a UHF TV output of 1200 watts. This tube is of the coaxial-cylinder type with electrode terminals insulated from each other by low-loss ceramic bushings. The indirectly heated cathode has a 120-volt heater.

RCA-6166 is a forced-air-cooled VHF power tetrode for TV transmitter service. It is rated for operation up to 220 Mc, and can deliver a VHF TV output of 12 kilowatts. This tube has a coaxial-electrode structure and utilizes a thoriated-tungsten filament.

RCA-15GP22 is a directly viewed tricolor kinescope of the glass-envelope type capable of producing either full-color or black-and-white pictures 11-1/2 inches by 8-5/8 inches with rounded sides. This picture tube utilizes three electrostatic-focus guns spaced 120 degrees apart with axes parallel to the tube axis, and an assembly consisting of a shadow mask and a plane, tricolor, Filterglass phosphor-dot (screen) plate located between the shadow mask and a clear-glass faceplate.

RCA-6AN8 is a general-purpose, multi-unit tube of the 9-pin miniature type containing a medium-mu triode and a sharp-cutoff pentode in one envelope. It is intended for diversified applications in color TV receivers. The triode unit with its relatively high zero-bias plate current is useful in low-frequency oscillator, sync-separator, sync-clipper, and phase-splitter circuits. The pentode unit with its high transconductance may be used as an if amplifier, video amplifier, agc amplifier, and reactance tube.

RCA-6BD4 is a low-current beam triode of the sharp-cutoff type designed specifically for the voltage regulation of high-voltage, low-current dc power supplies, such as the power supply used with the RCA-15GP22 tricolor kinescope.

RCA-3A3 is a half-wave vacuum rectifier tube of the glass-octal type utilizing an indirectly heated cathode. It is designed for use as a rectifier of high-voltage pulses produced in the scanning systems of color T.V. receivers.

RCA-6BY6 is a pentagrid amplifier of the 7-pin miniature type intended especially for use as a gated amplifier in color TV receivers. In such service, it may be used as a combined sync generator and sync clipper.

RCA-6AU4-GT is a damper diode for use in color TV receivers. It also may be used in black-and-white TV receivers utilizing picture tubes having 90-degree deflection.

Suggested User prices of RCA types 1854, 6181, and 6166 are as follows:

Type	*Suggested User Price*
1854	$1900.00
6181	835.00
6166	905.00

Suggested List prices of RCA types 15GP22, 6AN8, 6BD4, 3A3, 6BY6, and 6AU4-GT are:

Type	*Suggested List Price*	*Type*	*Suggested List Price*
15GP22	$265.00	3A3	3.10
6AN8	3.00	6BY6	2.00
6BD4	14.25	6AU4-GT	2.90

You get these PLUS + VALUES with RCA tubes

Top-notch Distributor Service

The services of your RCA Tube Distributor are as close as the telephone on your desk. When you buy through your local RCA Distributor, you simplify and centralize ordering procedures. Your RCA Tube Distributor acts as your local warehouse . . . assures you of quick, dependable delivery from his large and well-balanced stocks. You'll find him friendly, courteous, and always ready to help you with your tube requirements.

Planned Tube Inventories

Now you can avoid tube "shortages" and "overstocks" by adopting RCA's new TUBE INVENTORY MAINTENANCE PLAN. Your RCA Tube Distributor will make a survey of the tube requirements of your broadcast equipment and suggest a tube inventory plan tailored to your particular operation. There is no charge for this service.

Research and Engineering Leadership

Throughout the years RCA has worked closely with the broadcast industry, developing the new tube types required for each advance in broadcasting. The same RCA teamwork and leadership that have provided such famous tube families as beam power tubes and television camera tubes, will continue to bring you outstanding new types of tubes for the further development of broadcast services.

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ELECTRON TUBES — HARRISON, N. J.