NEW RCA-1847 MAKES HAM TELEVISION PRACTICAL

LOW-PRICED ICONOSCOPE OPENS NEW FIELDS FOR AMATEUR PIONEERS

Acclaimed at Chicago Parts Show where it was demonstrated in typical equipment

The fondest dream of transmitting and receiving pictures via Ham Television on Ham bands is now a reality.
June 11 to 14 were banner days for Ham Television when, for the first time, RCA engineers demonstrated transmission and reception at the equipment used will be described. Running continuously for 10 to 12 hours a day the envelope under the call of W1IXL, this gear clearly demonstrated to hundreds of enthusiastic amateurs, engineers, dealers, and distributors the practicality of good quality television communication with simplified and economical apparatus. Demonstrations were conducted on the 12th floor of the Blackstone Hotel overlooking Lake Michigan where it was possible not only to transmit indoor subjects but from off the lake and along the boulevard as well. Even skeptics and those "in the know" on television were amazed at the faithful reproduction and stability of the pictures along with the simplicity of the complete equipment.

Small Brother to Big "Ikes"
The advent of the new amateur Iconoscope RCA-1847 now makes it possible to construct a cost within the price range of a present-day amateur transmitter a complete television system. This "Mini-Ike" is a much simplified version of the larger and more familiar Iconoscope Television camera tubes used in large television studio cameras. It is 7 ¼" long, has a 3-inch face, and is capable of producing a clear, 120-line, 30-frame-per-second picture that is well suited for transmission in the 25- or 15-meter amateur band. RCA-1847 operates at relatively low voltage, employs inexpensive electrostatic deflection circuits, does not require keytimeout circuits, and can utilize low-cost, short-focus-length lenses. The tube is now available through RCA Transmitting Tube Distributors at the amateur net price of $24.50.

How the 1847 Works
The principal parts of the 1847 are its mosaic, signal electrode, collector, and electron gun. The position of these parts in the 1847 is illustrated...
**HAM TIPS from RCA**

**New RCA-1847 Makes Ham Television Practical**

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in the diagram below. The mosaic consists of a large number of small photosensitive particles deposited on one face of a transparent sheet of insulating material. The particles are spaced a very small distance apart so as to be insulated from each other. On the opposite face of the insulating sheet is the signal electrode, a transparent conductive film. This electrode makes contact with a band of conductive material on the inner surface of the bulb. Another band of conductive material is mounted on the external surface of the bulb, directly over the internal band. The capacitance between the two bands, in series with the capacitance between the signal electrode and mosaic, provides coupling between the mosaic and the signal-electrode terminal.

In the operation of the 1847, an image of a scene is focused on the mosaic and the beam of electrons provided by the electron gun is made to scan the image. As the beam moves over the image, there is generated across the signal-electrode load resistor a voltage whose magnitude at any instant depends on the brightness of the point where the beam is striking at that instant. This voltage is used as the video signal for television transmission of the scene viewed by the Iconoscope.

**How Much Illumination Is Needed?**

The lighting equipment required for operation of the 1847 can be simple. Inside-altered lamps are a convenient form of light sources. When an F2.3 lens is used, adequate lighting of photographs, drawings and other still subjects can be provided by a single 200-watt, inside-altered, spot-light bulb. A value of 1.5 focal lengths is generally suitable for the distance from the lens to the subject. For this spacing, the illumination on the subject should be at least one third as good as the illumination on the subject when the bulb is about 30 inches from the subject. For television "living talent" it is generally desirable to have a larger spacing between the lens and subject so that the lens will have a larger field of view. When this spacing is approximately 30 focal lengths or greater, the necessary illumination on the subject is 1500 foot candles.

**Gear Uses B. C. L. Parts**

Major equipment required for the operation of an amateur television system includes a television receiver, a camera and recorder unit and an ultra-high-frequency transmitter. Such equipment has been built by many laboratories of our engineering and described in detail in a series of articles recently published in the May, June and July issues of QST. A feature of all this apparatus is that standard broadcast receiver parts are used almost exclusively throughout the circuits.

**Receivers Straightforward Super**

The television receiver itself is a heterodyne and is designed to cover the 112-116 Mc amateur Television band. The output of the receiver terminates in a 3-inch Kinescope, type 3AP4/306-P4, which provides bright pictures in black and white. The tube line-up is as follows: A 956 Acorn type pentode is used as the first detector with a 6J5 oscillator. There are two r-f's using 6AC7/1852's. The second detector utilizes one diode section of a 6AF6 and is followed by one 6AC7/1852 video stage. The other half of the 6CH6 is used as a detector for synchronizing purposes only. This diode feeds a 6GC7 double triode, the first stage amplifier of which is used as amplifier and the second half as sync separator. Multivibrators containing one 6CH6 each are the scanning oscillators. The Kinescope anode potential of 1000 volts is obtained inexpensively from a small receiver power transformer with two 5U4-G's in a voltage-doubling circuit. The remainder of the tubes are operated from a low-voltage 3Y3-G supply.

**Modulator Contains "Ike"**

The modulator furnishes the complete television signal for modulating the r-f amplifier of the television transmitter. It consists of the RCA-1847 Iconoscope, a video amplifier capable of raising the initial signal level of a television signal to a level sufficient for modulation, a monitor Kinescope, scanning circuits for the Iconoscope and monitor, blanking and synchronizing signal generators, a high-voltage supply for the Iconoscope and monitor, and a low-voltage regulated supply. The scanning frequencies are 39 frames per second and 3000 lines per second. The video channel width thus required is about 200 kc which, of course, means 400 kc. on the air with double sideband modulation. Inasmuch as the entire 215-meter amateur band (for which this equipment is intended) is only 400 kc. wide, it is apparent that the channel width must be restricted to the minimum value needed for reasonable definition.

**Xtrm Uses Twin Beam 829**

The r-f transmitter proper is of simple and straightforward design. It has no frills or doo-dads. Although the rig employs a 40-meter crystal, only four r-f stages are required. The tube line-up begins with a 6L6 Tri- tet crystal oscillator, followed by a 6L6 25-meter doubler and then a 6L6 25-meter doubler. Output from the last doubler is sufficient to drive fully an 829 twin beam power tube as a straight push-pull final amplifier on 25 meters. This transmitter is capable of kicking out a carrier of 20 watts or better with video grid modulation and, incidentally, makes an excellent "phone" transmitter having considerably greater carrier output when used with a conventional plate modulator.

**Actual field tests conducted with this television gear have been made with the receiver located about 15 miles from the transmitter. It is anticipated that distances of 10 to 15 miles can easily be covered with this same equipment.**

We Scan the Crystal Ball

Television provides the next major development of amateur radio and once again the Ham is in an ideal position to go places. In this new art, amateur Television provides rich opportunity to gain new experience in circuit application and to work with the fascinating principles of lighting, photography and optics— all thrown in for one. For those who have felt that amateur radio is growing dull, here is the answer. As part of the issue, this book, just off the press, contains complete data on how actually to build the complete Television station described in these columns. Get a copy from your nearest RCA Transmiting Tube Distributor, or write to the RCA Manufacturing Company, Inc., Commercial Engineering Section, Harrison, New Jersey.