Model 100
Chassis View
Socket Controls

Fig. 2

Power Switch
Transf. 8K93

Low-Freq. (Vertical Sweep) 6F8G

High-Freq. Sweep 6C12

L.V. Rect. 5Z3

C.R. Bias (Brightness) 6L76 6F8G

Focus Control 6V6

Centering Controls 2nd. Video 1852

Sync. Separators 1st. Video 1852

Horiz. Control 3rd. I-F 1852

Vert. Control 2nd. I-F 1852

Vertical (Lo-Freq.) Control 1st. I-F 1852

IF Gain (Contrast) 6K8

Converter 1852

Braid from 3 Rotor Terminals Soldered to Chassis
ALIGNMENT AND OPERATION

Set the Picture Tube bias control all the way to the right. Set the Horizontal and Vertical sweep controls approximately half way.

Now, turn the Spot locating control (d) all the way to the left and rotate the other spot control (e) until it is in the entire range. If the arrow does not fit a proper range and tracking, it may be necessary to adjust the R.F. control properly. Once the proper range and tracking are obtained, move the spot locating control (d) slightly to the right and rotate the other spot control (e) until it is in the entire range again. Continue this procedure step by step until something appears on the screen of the Cathode Ray Tube.

Now adjust the Vertical and Horizontal sweep controls until a complete raster appears. This should be approximately 4" square (the actual picture will be somewhat smaller due to the presence of the Blank and Sync pulses in the scan line).

By means of the Spot Location controls (d) and (e) this pattern may now be centered on the tube face. The Cathode Ray Tube spot control can be rotated to level the Raster.

The size of the picture is determined by two factors: namely, the sweep circuit voltage and the sweep voltage applied to the second anode. The sweep increases with sweep voltage and decreases inversely as the square of the sweep voltage applied to the second anode. The saw-tooth voltage developed by the multi-vibrator is a function of the 2nd Anode voltage applied to the plates. Since we are operating near the cutoff point of the 2nd Anode voltage, it is impracticable to obtain any improvement in this direction, amplifier could be used to increase sweep voltage. But this would complicate matters greatly. The other alternative is to reduce the 2nd Anode voltage. Referring to the circuit diagram and 100,000 ohm 18607 dropping resistor is incorporated in series with the low voltage filter. This results in a larger picture, at only a slight sacrifice in brilliance. The use of this resistor is optional, depending upon which characteristic is more desirable.

The Image Ratio should be 4:3. If the picture does not conform to this ratio, a rearrangement of resistors in the sweep and screen circuits will correct this. Potentiometers could be inserted to control the voltages applied to the deflecting plates, but these additional controls are hardly necessary, since once this adjustment is made, it need not be changed, for a given set of tubes.

After this has been satisfactorily checked, we may proceed to the I.F. amplifier adjustments. An output meter or preferably Oscilloscope is connected across the output of the Video amplifier (160 plate). A signal from a Signal Generator or equivalent, is now introduced at the converter grid (6061). The intermediate frequency is 126.5. The I.F. transformers are now adjusted for maximum output in the conventional way.

Now introduce a signal whose frequency is approximately that of the principal station to be received, into the antenna circuit. Tune this signal by rotating the dial, until all the antenna and R.F. circuits for maximum output by means of the trimmers on the variable condenser.

After this has been done, the receiver is ready for a test on the air. It is best to make all adjustments on the fixed pattern transmitted by television stations during test periods preceding the regular scheduled programs. The I.F. system should now be re-adjusted by staggering the peaks to accept a wide band of frequencies 12 to 14 megacycles. This will result in considerable improvement in picture detail, with relatively slight loss in gain.

The I.F. transformers are heavily loaded with 1500 ohms across each secondary. It is possible to obtain these, with an increase in gain if these are carefully realigned to the peaks, with a resultant "square top" resonance curve over the desired bands.

RECEIVING ANTENNA

The installation of an antenna for Television reception is extremely important. In residential locations, the antenna should be elevated as high as possible and located in such a way as to be free from interference. Automobile ignition systems cause considerable interference, if electrical devices having sparking or intermittent contacts. Reflections from buildings, bridges and steel or other metal structures may result in multiple transmission, thereby producing 2 or more images superimposed on each other, due to the slight time difference in the arrival of the several reflected waves.

This effect may become extremely critical in large cities where a great number of these high structures are present. If possible a "line of sight" transmission path from the transmitter antenna should be selected. Again, care must be taken to obtain the maximum freedom from electrical interference, since this will result in spotting and blotching of the picture.

It is noticed that the effect of this "noise" interference, from automobile ignition systems, is much reduced when a horizontally polarized antenna is used in conjunction with a vertical antenna. Since, from all other considerations, it is equally as effective, it is therefore desirable to use such an antenna for the Television receiver, the field strength is sufficient to allow the necessary Signal for satisfactory operation.

A simple dipole with twisted pair lead-in for a transposed lead-in will usually give satisfactory results. These diploes are available in 60 feet and 100 feet lengths. The maximum pickup is obtained when the dipole is at right angles to the signal path from the transmitter, where several stations are to be received, or where a field strength is inadequate, more complicated forms of antennas may be required, or in the case of a directive antenna, a compromise may have to be reached so as to include all the desired stations within range. The length of the dipole is adjusted for maximum pickup from desired station. An overall length of 120 inches is suggested for a start. It may be desirable to use separate antennas feeding in different directions for different stations.

It is extremely important that the antenna be securely fastened so as to prevent swinging of either the antenna itself, or the transmission line, since this may result in intermittent blurring or loss of the picture. (To avoid complications, a K.V.U. system has been incorporated in this receiver.)

It is strongly recommended that the builder study all literature available on Televison and Ultra Short Waves before attempting to go ahead with the construction of this set. A knowledge of the exact function of each component will help greatly towards the successful accomplishment of the desired results.

References: QST - Dec, Jan, Feb, Mar, Apr, May 1937.
ELECTRONICS - 1937-38.
TELEVISION - Vol I and II - RCA Technical Press.