

Adding 3" C-R TUBE to *Low-Cost Television Set*

Described Last Month

Simple changes in home-made Television receiver more than double picture area, when 3" C-R tube is used.

Peter Scozzari

● THE design of a television receiver that will meet the requirements of the beginner presents some problems which differ from those encountered in commercial practice.

The high definition television in use today is inherently very complex. In order to obtain the full fidelity of the transmitted picture, approximately 225,000 picture elements must be reproduced on the screen of the cathode-ray tube. This means that the band width required to give maximum picture detail must be approximately 4 megacycles wide and must be maintained thus from antenna to cathode-ray tube. These requirements are met in commercial practice by the use of the superheterodyne circuit with a specially designed *intermediate frequency* system that will pass the desired band width. However, this is not the solution from the experimenter's point of view. While the superheterodyne has very desirable features, it is difficult to align, and requires an elaborate array of alignment instruments in order to do the job properly.

The T.R.F. (Tuned Radio Frequency)

due to its ease of construction and low cost has everything to recommend it. This circuit, if properly designed, will have sufficient band-pass for the smaller cathode-ray tubes.

It must be remembered that the resolution (dot size relative to screen area) of these small tubes does not permit the high order of definition of which the larger tubes are capable. Therefore, a 2 megacycle band-pass is sufficient.

In the October issue of RADIO & TELEVISION, a 2" tube television set was described by the writer. This produced very good images and had many desirable features. It was felt, however, that an improved model would be wanted by the advanced experimenter. Therefore, the original set was redesigned to utilize the new 906-P4 3" diameter cathode-ray tube, which provides a *black and white* picture instead of having the greenish hue which is characteristic of the oscilloscope type tube. This set also retains the desirable features of the previous model.

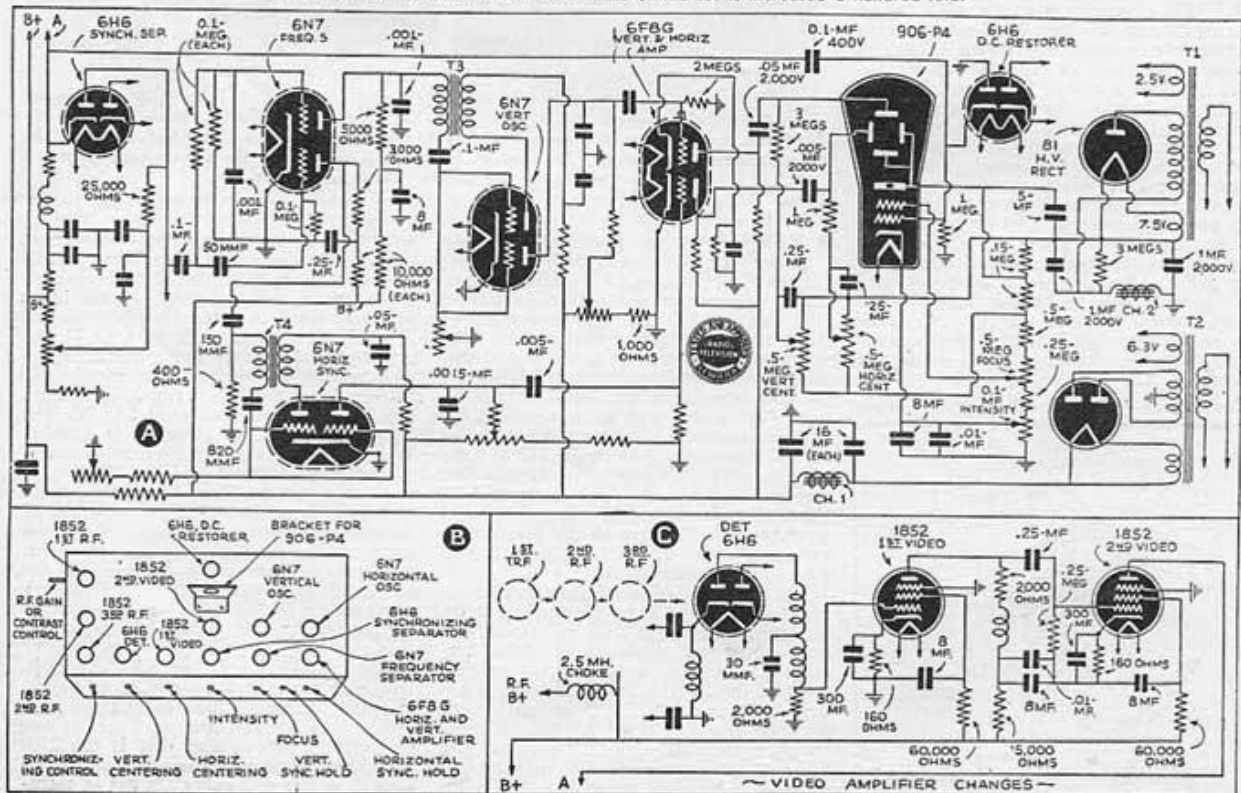
Constructional data will be given for those desiring to rebuild the 2" tube model to

accommodate the 3" tube. Those who wish to build this model are referred to the October issue for constructional details.

The power supply is rebuilt first. The high voltage power transformer is removed and the new one, supplying 1,200 volts, is installed, together with the high impedance choke and the 2,000 volt filter condensers.

Automobile ignition wire should be used in wiring the high voltage circuit. It should be noted that, unlike the previous circuit, the *negative* of the high voltage supply is grounded, because of some circuit changes in the main chassis. Particular attention should be paid to the 3 megohm bleeder resistor which is shunted across the output of the high voltage. This resistor discharges the high voltage filter condensers in a few seconds and is a measure of protection in the event that the voltage divider in the main chassis opens or the plug connecting to the power supply is not attached. It cannot be repeated too often that the *greatest care must be exercised in handling these voltages*. Whenever possible the re-
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Diagrams below show simple changes and few new parts added to the 2" television receiver to convert it for operation with 3" black and white C-R tube. The entertainment value of the set is increased a hundred-fold.



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sistance method of testing is recommended.

The balance of the power supply (the low voltage and heater supply for the main chassis) remains intact. The main chassis is modified in several respects.

The R.F. choke in the detector circuit, if changed to a 10,000 ohm resistor, improves the detail immensely.

The second video stage employs another 1852 instead of the 6F6 and is cathode biased with a 160-ohm resistor plus a high capacity condenser, thereby eliminating the dry cell previously used for biasing. The same arrangement is used for the first video stage.

The next circuit change made by the writer is in the *frequency separator*, which utilizes a 6N7 instead of the 6F7. This also eliminates the synchronizing potentiometers, R30—R34. While this change is not absolutely necessary, it does simplify the circuit. Those who are rebuilding the set need not alter the original 6F7 circuit.

Potentiometers R65—R63 are removed and the 100,000-ohm unit (R63), which was the focusing control, is used for the *intensity control*, and a .5 meg. potentiometer is used for focusing the 906-P4. As can be seen in the wiring diagram, the *intensity control* is in the cathode circuit of the 906-P4; this is necessitated by the fact that grid No. 1 is returned to ground through a 1.0 meg. resistor in order to make use of a D.C. restorer circuit.

A medium 7-prong socket should be mounted on the bracket to accommodate the 906 cathode-ray tube.

An 8-prong socket is also installed on the chassis close to the cathode-ray tube bracket to accommodate the 6H6 D.C. restorer.

Revised Parts List for 3" C-R Tube

NATIONAL UNION RADIO CORP. (Tubes)

5—1852
3—6H6
1—6F8G
3—6N7
1—80
1—81
1—906-P4

RCA MFG. (Transformers)

1—Hor. oscillation trans., No. 32899
1—Ver. osc. trans., No. 32898

THORDARSON ELEC. MFG. CO.

1—(T2) T13R15
1—(CH1) T75C49

KENYON TRANSFORMER CO.

1—(T1) T-208
1—(CH2) T-158

INTERNATIONAL RESIST. CO.

(Potentiometers)

3—100,000 ohm
1—50,000 ohm
2—150,000 ohm
1—.25 meg.
3—.5 meg.

(Resistors)

3—1,500 ohm
1—150 ohm
5—5,000 ohm
5—60,000 ohm
5—250,000 ohm
2—175 ohm
1—1,500 ohm
2—2,000 ohm
4—1 meg.
1—40,000 meg.
3—.5 meg.
2—3 meg.
1—2 meg.
1—30,000 ohm
2—5,000 ohm
2—3,000 ohm
1—1,000 ohm
6—100,000 ohm
1—400 ohm
2—10,000 ohm
1—600,000 ohm
1—2,000 ohm, 10 watt
1—50 ohm, center tap, 20 watt
1—100,000 ohm, 1 watt
2—160 ohm

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CORNELL-DUBILIER CORP. (Condensers)

3—16 mf., 450 v.—JR-516
5—8 mf., 450 v.—JR-508
3—.05, 400 v.—DT-4S5
1—.005, 600 v.—DT-6D5
1—.0015 mica, 1 w.—5D15
14—.01, 400 v.—DT-4S1
5—.25, 400 v.—DT-4P25
5—.1 mf., 400 v.—DT-4P1
1—.5, 400 v.—DT-4P5
1—10 mf., 25 v.—BR-102
4—150 mmf., mica—3L-5T15
1—820 mmf., mica—1W-5T8
1—50 mmf., mica, 5 w.—5Q5
2—.001 mica, 1 w.—5D1
1—.05, 2,000 v.—DT-16S5
1—.005, 2,000 v.—DT-16D5
2—1 mf., 2,000 v.—TQ-20010

SOLAR MFG. CO. (Condensers)

6—100 mf., 25 v.—M-0100
(3—In parallel to make 300 mf.)