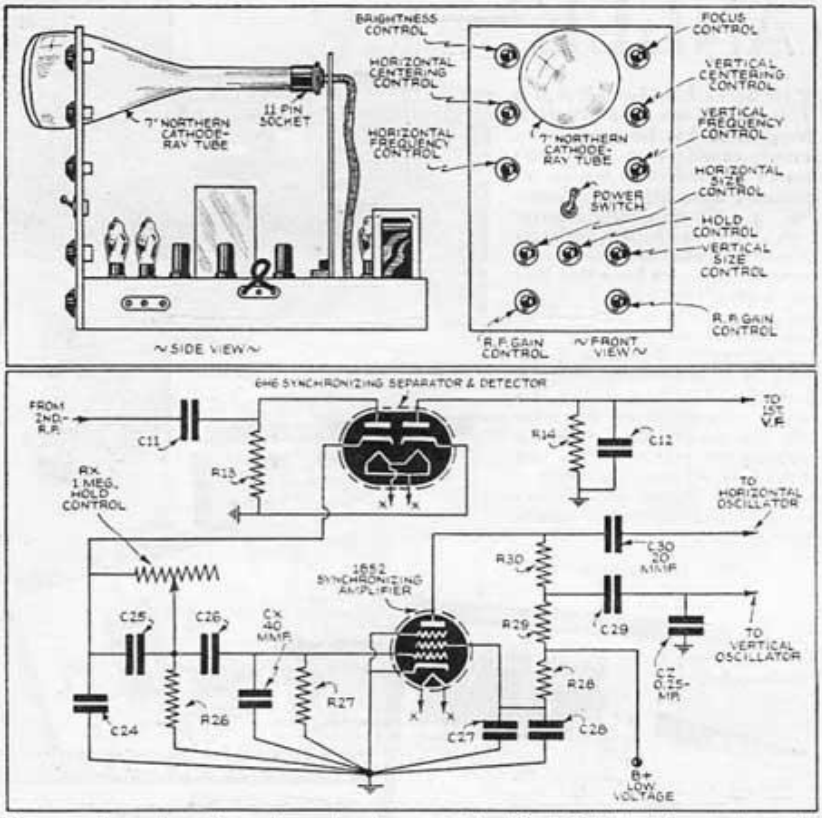
Adapting "R & T" Television Receiver for 7" Tube

Ricardo Muniz, E.E.



Diagrams above show the easily made changes in the "R. & T." television receiver, which adapts it for use with 7" dia. cathode-ray tube. This size tube gives images about 4" x 5", an ideal size and very entertaining.

● THE author's attention has been attracted for some months to a 7" picture tube which sells for little more than the price of a 5" picture tube. This article shows how it may be used in the "R. & T." televisor. Some minor changes which have improved reception are also described.

The 5" tube installed in the "R. & T." televisor for the article appearing in the February issue of RADIO & TELEVISION has been performing quite nicely now for about two months. Picture quality is sharper than many superheterodyne televisors are producing. The inherent tube damping, at these ultra-high frequencies, has been found sufficient, without the need for putting damping resistors across the tuned circuits, to give good band pass and therefore sharp pictures. The old "itch" to experiment and "improve" came however and proved irresistible.

The first step was to acquire a "Northern" NO07-T4 Type cathode ray television picture tube. This tube plugs into the same 11 prong socket as the 5" tube used previously. This socket was erroneously listed in the February issue—it is a Naald Type 211 FC. The tube has a T4 phosphor which fluoresces white when the cathode ray beam strikes it, giving black and white pictures as did the 5" and 3" diameter tubes used previously. The new picture size is 4¼" x 5¾" roughly. The new 7" tube was inserted directly in place of the 5" tube for a preliminary test. It was found that the gain provided by the sweep amplifiers was more than ample to deflect the beam of this tube and produce a normal picture size. The brilliance however was too low for comfort, although the picture was perfect when viewed in a fully darkened room.

Televisor which used 10 tubes including sound section with 3" picture tube and 14 tubes with 5" picture tube now operates 7" picture tube with no additional tubes and only minor changes.

It will be noted that in the February "R. & T." a Kenyon Type T 203 transformer was specified, but that the 1500 volt tap was used. Increasing the accelerating anode voltage by shifting to the 2200 volt tap on T. was found to produce very good brillance. The focussing and brilliance were further improved by changing R23 in the high voltage bleeder from 1 megohm to 500,000 ohms.

The 7" tube now performed very well indeed—so well in fact—that it was sought to further improve the set. As a consequence certain changes, all minor ones, were made in the receiver, which brought about improved performance.

The most notable change was the addition of a hold control. The clipper circuit and synchronizing amplifier are reasonably automatic in maintaining % clip at the required value of 15% but the replacement of R25 (2 meg.) by a 1 megohm pot, was found to improve synchronizing qualities. This new control permits the clipping % to be adjusted somewhat to accommodate locations having weak signal strength. A study of the T-111 standard television signal will show that the synchronizing pulses comprise the upper 20% of the modulation envelope. Clipping too much will mix picture with synch.—too little may reduce synch. below operating level.

A 40 mmf. condenser, Cx, was connected from grid of synch. ampl. to ground, to further reduce R.F. at this point; this improved synch. A .25 mf. cond. connected from *Vert.* synch. output of synch. amplifier to ground, helped clear "line" synch. pulses out of this lead; synchronization was further improved. Changing C30, the *horizontal* synchronizing pulse output condenser from the synchronizing amplifier from .0005 to .00002 mf. helped clear these pulses up. These changes all improved picture stability when low signal strength was encountered. Pictures are now *rock-steady!*

Both the *horizontal* and *vertical* frequency controls were found to be operating near one end of their range. R36 in the *horizontal* oscillator was changed from 25,000 ohms to 50,000 ohms; C35 in the vertical saw-tooth oscillator was changed from .2 mf. to .1 mf. This corrected the condition.

Linearity of picture was not quite as good with the 7" tube as it had been with the 5" tube. The picture was found to be slightly impressed at the bottom and at the left side. This was improved by changing R2 and R8.

The changes were made in large measure under the skilled hands of Andy Tait, recent graduate of Brooklyn Technical High School and last term president of the Television Club there.

Parts List

INTERNATIONAL RESISTANCE CO.

1—1 meg. potentiometer, Rx
1—50,000 ohm, 1 watt resistor; replacing R36 (See December, 1939, R. & T.)
1—500,000 ohm, 1 watt resistor; replacing R23 (See February, 1940, R. & T.)

CORNELL-DUBILIER

1—.25 mf., DT-4P-25 condenser, Cx
1—.00002 mf. 5W-5Q2 condenser; replacing C30 (See December, 1939, R. & T.)
1—.00004 mf. 5W-5Q4 condenser, Cx
1—.1mf. DT-4P1 condenser; replacing C35 (See R. & T., December, 1939)

NORTHERN MFG. CO.

1—N007-T4 Television picture tube (7" dia.)

ALDEN PRODUCTS CO.

1—211 FC-11-prong, large cathode-ray tube socket