

PICTURE-TUBE TESTER AND REJUVENATOR

BY WILLIAM R. SHIPPEE

TV picture tubes are expensive—especially the ones for color. If you have one that has seen better days and is getting a bit dim and dark, you can probably add new life to it by using the tester-rejuvenator described here. You will not have the equal of a new tube, but you may be able to keep the old one going for a while.

The circuit shown is used to test the emission of a cathode-ray tube; and if it is low, give the CRT a "shot" to revitalize it. The latter consists of raising the emission of the CRT by increasing the filament voltage. This "boils" the inner electrons of the cathode structure, bringing them to the outside where they can do the most good. The circuit will also remove some cathode/control-grid shorts. After using this circuit, a conventional picture-tube brightener can be used if the rejuvenated CRT does not exceed 50% emission as shown on the meter.

Construction. Any type of vacuum-tube transformer can be used for *T1* as long as the high-voltage winding does not exceed 400 volts rms. This winding should deliver at least 50 mA, and the current ratings of the two filament windings should be at least one ampere. The filament windings must be properly phased so that approximately 11.3 volts appear across the series combination. If you don't get 11.3 volts, reverse the connections to one of the filament windings.

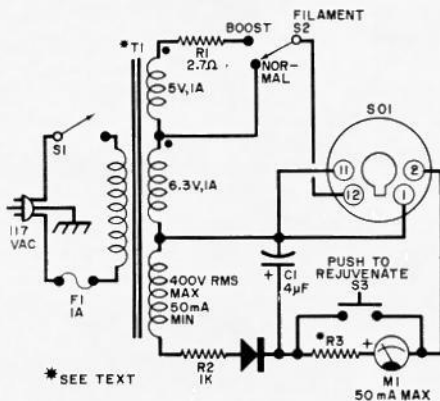
The meter should not have a full-scale reading over 50 mA. To calculate the value of *R3* for your particular meter, use Ohm's law to determine the resistance through which 50 mA will flow at the high-voltage dc obtained from the rectifier-filter circuit. As an alternative, you can start with a value of several kilohms and reduce it until the meter indicates exactly full scale. Take care not to contact the high voltage when working with the resistor.

You can connect other sockets to *SO1* to suit your own particular type of tube, using pins 1 and 12 of *SO1* for each of the filaments of the tube and pin 2 switched to each of the control grids of the tube.

Operation. With filament switch *S2* in the NORMAL position and pushbutton switch *S3* open, note the meter indication. To rejuvenate the CRT, momentarily depress *S3*. You may note a small arc in the neck of the tube. Release *S3* and note whether the meter indication has increased.

If the meter still indicates low, place *S2* in the BOOST position, wait a second for the filament to get hotter, and then depress *S3*. Return the filament switch to NORMAL and press the rejuvenate pushbutton a couple of times. The meter should show a marked increase. It may be necessary to repeat this operation several times, but do not leave the filament switch in the BOOST position for any length of time.

Remember that, on color tubes, there are usually 3 guns, so an adapter socket must be used with the circuit shown below. ♦




PARTS LIST

- C1*—4- μ F, 600-volt electrolytic capacitor
- D1*—1-A, 800-V silicon rectifier
- F1*—1-A slow-blow fuse and holder
- M1*—50-mA meter (see text)
- R1*—2.7-ohm, 5-watt resistor
- R2*—1000-ohm, 2-watt resistor
- R3*— $\frac{1}{2}$ -watt resistor (see text)
- S1*—Spst switch, 1 A, 117 V
- S2*—Spdt switch, 1 A
- S3*—Spst pushbutton switch, normally open, 600-V contact rating
- T1*—Power transformer; secondaries: 400 V at 50 mA, 6.3 V at 1 A, 5 V at 1 A
- Misc.—Suitable chassis, line cord, CRT socket(s), high-voltage cables for sockets.

AUTHOR SOLVES PROBLEM

I appear to have made an error in my "Picture-Tube Tester and Rejuvenator" (October 1973). I stated that a 50-mA meter movement was needed when it should have been 5 mA. This would account for any arcing that occurs *without* S3 being depressed. The value of R3 should be ten times the conducting resistance of the CRT, an impossible demand placed upon a

POPULAR ELECTRONICS

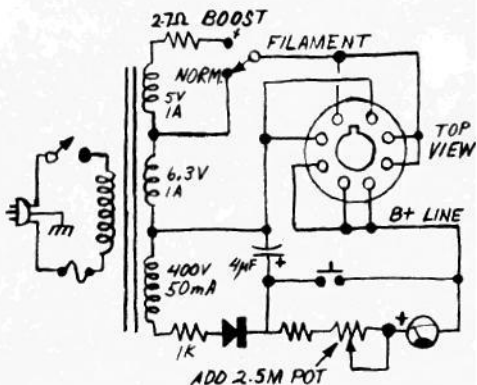


scheme using a 50-mA movement. By using 5-mA or lower movement, the problem of burning up the resistors, which might also occur when the arcing problem exists, will be eliminated.

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"Picture Tube Tester and Rejuvenator" came just in time. It saved me the cost of a new color tube; all I had to do was rejuvenate my bad red gun.

I would like to make a suggestion to other readers who are interested in building this project. Coletronics Service Inc. (1744 Rockaway Ave., Hewlett, NY 11557) sells a Model MH-3 CRT multi-head adapter that works with both color and monochrome picture tubes. I used an



eight-pin socket on the rejuvenator to match the adapter, connecting it as shown in the drawing. I hope other builders will find my modification useful.

THOMAS F. LA CHE
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Many thanks for passing on your idea.