Follow these easy steps

A weak, shorted, or dead receiving tube will cause different effects on the picture, or will affect the sound or possibly both picture and sound. *If you know which tubes to test, many color and black and white TV troubles can be corrected by testing only a few tubes.*
If your TV set uses receiving tubes the following tips will help you in determining which tubes you should test and how to go about it.

A. **VISUAL INSPECTION** can save you some time. Look through the perforated back cover of the set for tubes that are not lit, flash internally or that glow a deep purple. You will want to test these tubes first.

B. **COMPARE THE SYMPTOMS YOUR SET HAS WITH THOSE PICTURED.** The numbers beneath each picture identifies the tubes *by function* which are most likely to be causing the trouble and should be tested. When repairing a color set, the first step is to correct any black and white picture problems. You can't get a good color picture if you can't get a good black and white picture. Most of the tubes in a color set have the same function that they do in a black and white set.

C. **YOU CAN QUICKLY LOCATE SUSPECTED TUBES** by consulting the tube location chart. It is usually glued to the inside or back of the cabinet. This chart, gives the *functions,* type numbers and positions on the chassis of all the tubes. If a layout chart isn't available, make a sketch of the chassis carefully noting the position of each tube so that they can be returned to their original sockets.

D. **TO GET AT THE TUBES YOU MUST REMOVE THE BACK OF THE SET.** *First, disconnect the power by unplugging the set at the wall outlet.* Then, remove the screws that secure the back cover. CAUTION: HIGH VOLTAGES MAY BE PRESENT AT CERTAIN POINTS IN THE SET LONG AFTER THE POWER HAS BEEN TURNED OFF—*DO NOT TOUCH THE PICTURE TUBE, PICTURE TUBE HIGH VOLTAGE LEAD WIRE OR ANY METAL WITHIN THE HIGH VOLTAGE CAGE.*

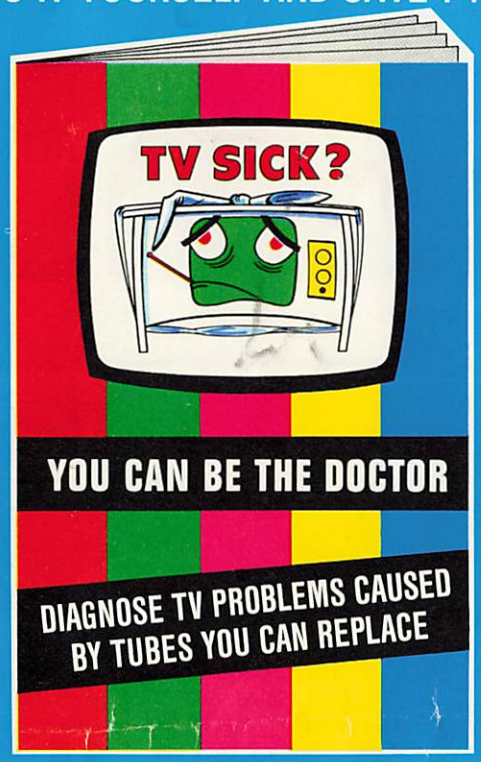
E. **TO REMOVE THE TUBES** gently rock them from side to side while pulling away from the socket. Some tubes may be covered with metal covers called shields. Some can be removed by simply lifting it off the tube, others you simply press down and twist slightly and lift up. Most tuner tubes use a telescopic type shield whereby you press down on the upper portion of the shield and then remove the tube.

F. **LABEL EACH TUBE AND SOCKET** with the duplicate number labels that come with this brochure as you remove each tube. This will avoid a mix up when you put the tubes back. A lot of tubes look alike but have entirely different electrical connections and properties. Putting them in the wrong sockets can damage the tubes and other set components.

G. **TESTING TUBES ON A MODERN SELF SERVICE TUBE TESTER IS EASY.** Simply follow the instructions on the tester panel. Testers do vary somewhat in operation and design. On most you look up the tube type number in a chart, set a few controls, insert the tube in the specified socket. press the test switch and read the condition of the tube on a meter and/or indicator lamps. You will find a complete stock of nationally advertised replacement tubes at all tester locations.

H. **REPLACING TUBES**—After you have tested the tubes and purchased any new ones you need, install them in the set. *Make certain to put them in the right sockets. Remove the identification labels you have placed on the tubes and sockets one at a time.* Be sure to replace all tube shields and the high voltage cage panel if it has been removed to gain access to the tubes.
Replace the back cover. Make sure that the interlock connection to the power cord is properly seated and making contact and that the antenna is connected. Plug the set in, turn it on, and enjoy your favorite program.

DO IT YOURSELF AND SAVE . . .



THIS NEW BOOK GIVES YOU . . .

The "inside track" on television troubles. It shows how easy it is without previous experience or electronics schooling to spot and cure common ailments. Available where you obtained this brochure.

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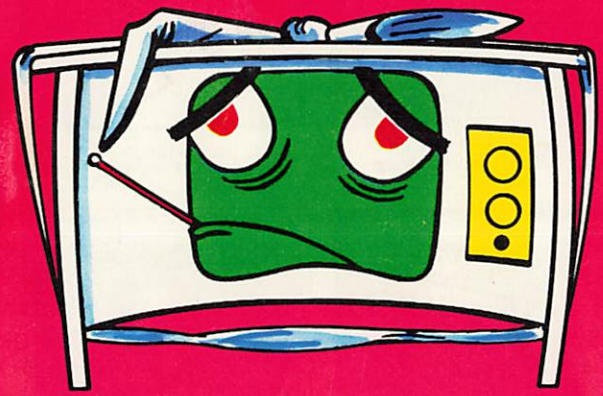
C-019-06-976

FREE... take one



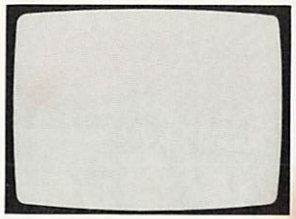
TV SERVICE TIPS

SAVE MONEY.....
Follow these simple instructions to test both COLOR and Black & White TV Chassis Tubes
Pay only for... NEW TUBES

Do-It-Yourself

COLOR and BLACK & WHITE TV TROUBLES . . . and the tubes that usually cure them . . .

WEAK SNOWY PICTURE OR
NO PICTURE, WEAK OR NO SOUND
SEE STEP . . . 1



SCREEN LIGHTED
NORMAL OR NO SOUND
SEE STEPS . . . 1. 2. & 3

NORMAL PICTURE
NO, WEAK, OR DISTORTED SOUND
SEE STEPS . . . 1. 2. 3. 4. & 5

PICTURE BENDS
SOUND OK
SEE STEPS . . . 2. 3. 6. 7. & 11

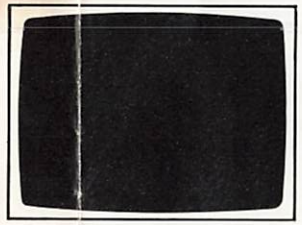
FLOP OVER
SOUND OK
SEE STEPS . . . 7. & 8

LACKS HEIGHT
SOUND OK
SEE STEP . . . 8

PICTURE FOLDOVER
SOUND OK
SEE STEP . . . 8

DIAGONAL LINES
SOUND OK
SEE STEPS . . . 7. 9. & 11

PICTURE LACKS WIDTH
SOUND OK
SEE STEPS . . . 9. 10. 11. 12. & 13



NO PICTURE (NO LIGHT)
SOUND OK—SEE STEPS . . . 9. 10. 11. 12. & 13
NO SOUND—SEE STEPS . . . 4. 5. & 13

NO COLOR—B/W PICTURE OK
SOUND OK
SEE STEP . . . 14

PICTURE TOO BLUE OR TOO RED
OR TOO GREEN. SOUND OK
SEE STEP . . . 15

COLOR BARS THROUGH PICTURE
SOUND OK
SEE STEP . . . 16

BAND THROUGH PICTURE
SOMETIMES HUM IN SOUND
SEE STEP . . . 17

1 **TEST RF AMPLIFIER TUBE.** Located on tuner. Look for the following tube types: 2BN4, 2CW4, 2CY5, 3HA5, 3HM5, 3HQ5, 4HQ5, 6CW4, 6DS4, 6GK5, 6HA5, 6HQ5, 6FH5, 6FQ5.

TEST OSCILLATOR MIXER TUBE. Located on tuner. Look for tube types such as 5CG8, 5CL8, 5GJ7, 5GS7, 5GX7, 5KE8, 5EA8, 6AT8, 6BE8, 6BR8, 6CG8, 6CL8, 6EA8, 6FG7, 6HB7, 6KE8, 6KZ8, 6LJ8, 6U8, 7HG8, 9KZ8.

2 **TEST VIDEO (PICTURE) IF TUBES.** Usually two, three, or four miniature tubes in a line. Look for tube types such as: 3BZ6, 3CB6, 4BZ6, 4CB6, 4EH7, 4FJ7, 4HM6, 4HT6, 4JC6, 4JD6, 5AN8, 6AR11, 6BZ6, 6CB6, 6EJ7, 6EW6, 6GM6, 6HM6, 6HT6, 6JC6, 6JN8, 8BM11, 11BQ11.

3 **TEST VIDEO AMPLIFIER OR VIDEO OUTPUT TUBE.** Typical type numbers are: 6AF11, 6AU8, 6AW8, 6CX8, 6GN8, 6HF8, 6JA8, 6LQ8, 8AW8, 8JV8, 10CW5, 10EB8, 10GN8, 10HF8, 10JY8, 10KR8, 10LZ8, 11KV8, 11LQ8, 12BY7, 14BL11, 14BR11, 15BD11, 16GK6.

4 **TEST SOUND IF, DETECTOR, AND AMPLIFIER TUBES.** Look for types such as: 3CB6, 4AU6, 4CS6, 4DT6, 6AF11, 6AU6, 6BN6, 6BN8, 6GL8, 6DT6, 6FV8, 6GH8, 6HF8, 6HZ6, 6LN8, 6LX8, 6T10, 8JV8, 9A8, 10GN8, 10HG8, 10JY8, 12AE10, 12BA6, 13V10, 13Z10, 14BL11, 14BR11, 15BD11, 17BF11.

5 **TEST SOUND (AUDIO) OUTPUT TUBE.** Look for tube types such as: 5AQ5, 6AQ5, 6BK5, 6CU5, 6EH5, 6GH5, 6T10, 10JY8, 11BM8, 12AE10, 12FX5, 13V10, 13Z10, 16GK6, 17BF11, 17C5, 17CU5, 50C5.

6 **TEST AGC TUBES.** Look for tube types such as: 4AU6, 4HS8, 6CL8, 6FV8, 6GH8, 6GY6, 6JN8, 6LQ8, 6LX8, 8B10, 8BA11, 8JV8, 8KA8, 9A8, 10GN8, 10JY8, 11BM8, 11KV8, 11LQ8, 14BL11, 14BR11, 15BD11.

7 **TEST SYNC (SYNCHRONIZING) TUBES.** Often one part of a dual-function tube. Typical type numbers. 4HS8, 6AF11, 6AV6, 6FQ7, 6GH8, 6GN8, 6JA8, 6JE8, 6KA8, 6HS8, 6LN8, 6LX8, 8B10, 8BA11, 8JV8, 8KA8, 9A8, 10EB8, 10GN8, 10JY8, 10KR8, 10LZ8, 23Z9.

8 **TEST VERTICAL OSCILLATOR AND VERTICAL OUTPUT TUBES.** They may be two tubes or one dual-function tube. Look for tube types such as: 6CG7, 6DE7, 6DR7, 6EA7, 6EM5, 6EM7, 6FQ7, 6FY7, 6JZ8, 6KY8, 8AW8, 8BA11, 8CG7, 8FQ7, 9A8, 10CW5, 10DE7, 10GK6, 10GV8, 13FM7, 13GF7, 15KY8, 16GK6, 17JZ8, 21LR8, 23Z9.

9 **TEST HORIZONTAL OUTPUT TUBE.** Usually located near high-voltage compartment. Typical type numbers: 6DQ6, 6GE5, 6GW6, 6GY5, 6JB6, 6JE6, 6JF6, 12DQ6, 12GE5, 12JN6, 17JB6, 17JN6, 18GB5, 21GY5, 21JZ6, 21KA6, 21KQ6, 22JF6, 22JU6, 33GY7, 33GT7, 38HE7, 38HK7, 33JV6.

10 **TEST DAMPER TUBE.** Look for tube type such as: 6AD4, 6AU4, 6AX4, 6AY3, 6BE3, 6CK3, 6CQ4, 11R3, 12AF3, 12BR3, 12RK19, 16AQ3, 17AY3, 17BE3, 17BR3, 17BS3, 17BZ3, 20AQ3, 22BW3, 33GT7, 33GY7, 38HE7, 38HK7.

11 **TEST HORIZONTAL OSCILLATOR TUBE.** Typical type numbers: 5KD8, 6B10, 6CG7, 6EA8, 6FQ7, 6GH8, 6LN8, 6LT8, 6LX8, 8B10, 8CG7, 8FQ7, 8LT8, 9A8, 12BH7. NOTE: If this type is replaced,you may have to readjust the horizontal frequency or drive controls.

12 **TEST HIGH VOLTAGE RECTIFIER TUBE.** Located inside the metal high-voltage compartment. Typical type numbers: 1AD2, 1BC2, 1BK2, 1BL2, 1G3, 1K3, 1X2, 2AS2, 3A3, 3AT2. CAUTION: BE CAREFUL WHEN REPLACING THIS TUBE. The base of this tube connects to the picture tube, which stores a very high voltage, even after set is turned off. To be safe, do not touch any metal in the high voltage compartment. If top cap of tube is metal, use an insulated tool to remove the cap.

13 **TEST LOW VOLTAGE RECTIFIER TUBE.** Look for tubes such as: 3DG4, 5BC3, 5DJ4, 5U4. Most modern sets use semiconductor diodes which must be replaced by a service technician.

14 **TEST COLOR KILLER, CHROMA AMPLIFIER, CHROMA OSCILLATOR, BURST AMPLIFIER AND CHROMA PHASE DETECTOR TUBES.** Typical tube types are: 6AF9, 6BL8, 6BN8, 6BW11, 6EW6, 6GH8, 6JC6, 6JU8, 6KT8, 6LN8, 6M11, 8BN11, 8BU11, 9MN8 and 10JT8.

15 **TEST ALL COLOR DEMODULATOR TUBES AND DIFFERENCE AMPLIFIER TUBES.** Typical tube types are: 6AC10, 6BL8, 6BU11, 6DB6, 6GH8, 6GU7, 6GY6, 6HZ6, 6JU8, 6LE8, 6MD8, 6ME8, 6ML8, 8FQ7, 12AZ7, 12BV11 and 12MN8.

16 **TEST BURST AMPLIFIER TUBE AND CHROMA PHASE DETECTOR TUBE.** Typical tube types are 6BN8 and 6JU8.

17 **TEST ALL TUBES.** Just about any tube in the set can cause this problem. Be on the lookout for one that shows a short.