

PLAIN TALK

AND

Technical Tips

a monthly publication for the service industry prepared by:



RCA VICTOR



VOL. 10

NO. 9

SEPTEMBER, 1967

PRODUCT PERFORMANCE
RCA SALES CORPORATION

GOOD SAFETY PRACTICES TELEVISION SERVICING

Recently there has been a good deal of trade press information published highlighting the possibility of X-radiation from television receivers. For this reason, it is important to re-emphasize good service practices and precautions the service technician should follow. Initially, let us assure you that RCA Victor television instruments are designed to limit X-radiation to a safe level—well below the guidelines recommended by Underwriters' Laboratories and the National Council on Radiation Protection and Measurement (known as NCRP), an independent non-profit organization operating under a federal charter.

The majority of color television servicing facilities usually include a test fixture (jig). However, does the test fixture, whether built in the shop, purchased, or possibly a converted instrument, meet general safety requirements for the following:

IMPLOSION X-RADIATION SHOCK HAZARD

It is important that all distributors, dealers, and service technicians review (and if necessary update) their servicing procedures and service equipment for optimum safety.

Proper Implosion Protection—Test Fixtures

Some test fixtures—particularly those for color—may be constructed with less than desirable safety features. Some shop fixtures do not use a picture tube with adequate implosion protection. This type test instrument presents a possible hazard to the servicing technician. The possibility of picture tube implosion may increase during service operations. It is logical to assume that the chances of hitting the tube with a chassis, tool, or some other object is more likely in the servicing area than in the customer's home. For this reason, it is recommended that *only* an implosion protected picture tube be used in a test fixture. This provides the necessary implosion protection. (If a non-protected tube is used, an external safety glass should be included.)

In an effort to maintain safety standards in the servicing industry, RCA is suggesting that *laminated* tube type 1830P22 be used in your 90° color test jig. Please contact your nearest RCA Parts Distributor for further information regarding test picture tubes.

Continued on page 4

NEW MARK 8 ATTACHMENT

The recently announced MJC 26 Mark 8 tape cartridge player attachment is designed to play the familiar endless loop 8-track cartridges. To operate the MJC 26 the cartridge is inserted through a door located in the front panel of the tape attachment. When the MJC 26 is operating, a channel indicator light which is visible through the translucent front panel shows which of the four dual track channels is playing.



Figure 1—MJC 26 Attachment

Because the MJC 26 is designed to operate with a wide variety of stereo amplifiers it will provide an output signal of approximately .3-volts. Signal output termination is via a 6-foot shielded cable with standard phono plugs—right channel plug is coded red.

Continued on page 4



Figure 2—Bottom View Showing Level Control

IN HOME SERVICE APPROACHES

Many television service problems can be successfully handled without removing the back from the instrument. This statement may not shock experienced service technicians, for they have learned there are a number of reasons for a problem to exist and usually, the simplest reason has caused the problem. So, a good rule of thumb is. . . . *Check the simple things first.* Let's consider a few examples:

Mrs. Customer complains of no picture and no sound. Several things could cause this condition; no A. C. input, a defective power transformer, a defective B+ rectifier, a defective power switch, or perhaps a few other reasons of a simple nature. However, the most common and simplest reason is an open circuit breaker (or fuse). The reason for the breaker opening could be a B+ short, but many times it is caused by a momentary surge of current. In this case simply resetting the breaker restores normal set operation.

Color television, because of its complexity, fools many people into expecting complex problems. Loss of color is a frequent cause for a service call; possible reasons are many and varied, but let's examine the simpler ones.

Loss of Color

Often, loss of color is caused by control misadjustment; most frequently the FINE TUNING control. The solution is properly adjusting the fine tuning to restore the color picture. If this is the problem, proper servicing technique includes rotating the CHANNEL SELECTOR to check the "reset" ability of fine tuning, and, of course, customer instruction. The COLOR or COLOR INTENSITY control is frequently misadjusted, causing a loss of color. Modern color television instruments

however, now include circuitry refinements such as *automatic fine tuning* (AFT) and *automatic chroma control* (ACC) which will minimize problems caused by control misadjustment.

Another frequent cause of color loss is color killer control misadjustment. A misadjusted color killer can also cause intermittent color when receiving noisy signals.

Antenna System

The antenna (or antenna system with accompanying transmission lines and amplifiers) is another problem area—causing various problems. Symptoms include noisy signal, loss of signal, flashing, ghosting, beat patterns, loss of color, color distortion and weak color. The antenna system is a prime suspect when any of these symptoms appear.

One of the best servicing techniques to use for checking antenna performance is substitution. If the signal strength permits, an indoor antenna may be substituted for the suspected system. In cases of flashing and signal intermittents, the original transmission line should be shorted and dressed away from the instrument—to eliminate or minimize the possibility of coupling the signal into the substituted antenna system. If signal strength or other limitations do not permit substitution, then the instrument could be substituted. A small, inexpensive, portable black-and-white set with good definition is an excellent servicing tool for verifying most antenna system faults.

This article has described a few of the problems caused by relatively simple reasons. Efficient technicians develop servicing procedures with just this guideline—to eliminate those simple possibilities first.

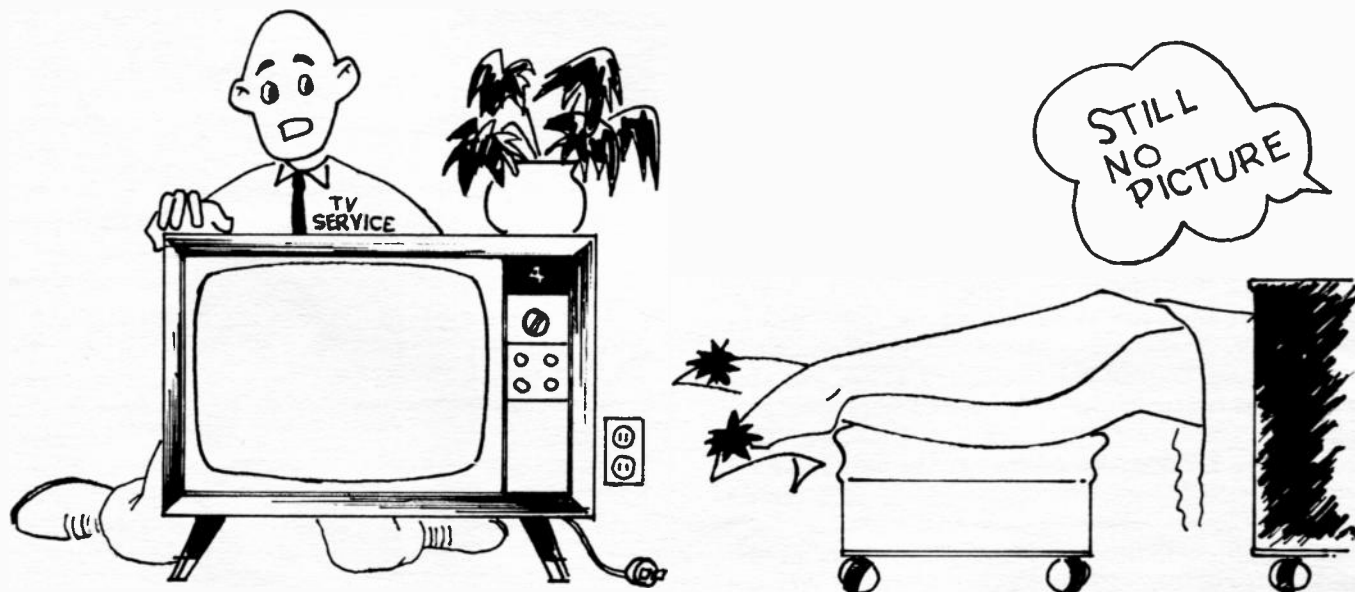
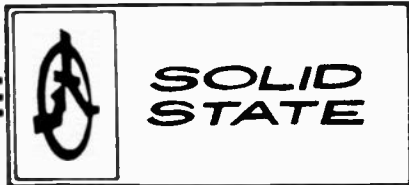


Figure 3—Mrs. Customer Has a Problem



IN-CIRCUIT TRANSISTOR TESTER

RCA recently announced a new portable transistor tester. The WT-501A is designed to test transistors accurately both in-circuit and out-of-circuit. Applications ranging from a quick check of dc beta to an extensive analysis of transistor performance make the WT-501A valuable for use in the service shop, factory, or laboratory.

Features include a color-coded panel for simplified operation, and mirror-scale meter to eliminate inaccurate readings due to parallax. The tester is completely safe—transistors will not be damaged even if the test leads are improperly connected.

Two test sockets are provided on the panel, one for NPN transistors and the other for PNP transistors. This feature permits convenient transistor matching for complementary symmetry applications. Three color-coded test leads are provided for in-circuit testing, or for use with transistors that do not fit the panel socket.

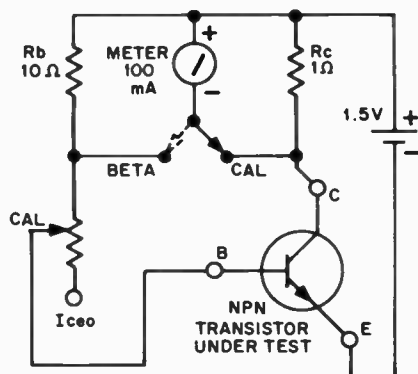


Figure 4—Simplified Beta Measuring Circuit

Current Ranges

The test collector current (I_C) is continuously adjustable, from 10 microamperes to 1 ampere, so that both low power and high power transistors can be checked. If desired, a complete DC Forward Current Transfer Ratio Curve (beta vs. collector current) can be plotted.

Out-of-Circuit Tests

The WT-501A permits out-of-circuit dc beta measurements over a beta range of 1 to 1000. Collector-to-base leakage currents (I_{CBO}) as low as 1.0 microampere may be accurately measured. Another important dc parameter I_{CEO} (collector-to-emitter leakage) can be measured over a range of 20 microamperes to 1.0 ampere.



Figure 5—WT-501A Transistor Tester

In-Circuit Tests

The WT-501A Transistor Tester will test current gain of transistors in-circuit with collector current (I_C) adjustable from 0 to 1 ampere. Low-power transistors are tested with an I_C of 10 ma, using the 0-to-100 ma range. Intermediate power and high power transistors are tested at 100 ma on the 0 to 1 ampere range.

The in-circuit beta measurement often will be lower than out-of-circuit beta measurement for the same transistor, depending on the resistance of the circuit. In some special applications, such as a TV horizontal deflection stage, the circuit resistance is so low that the transistor cannot be tested in-circuit. These transistors are usually inserted in sockets however, and can easily be removed and tested out-of-circuit.

The portable WT-501A requires no external power source—two "D" size batteries are used. The instrument weighs $2\frac{3}{4}$ pounds, and measures $6\frac{7}{8}$ inches by $5\frac{1}{4}$ inches by $3\frac{1}{8}$ inches. Clips are provided on the handle for convenient storage of the test leads.

GOOD SAFETY PRACTICES TELEVISION SERVICING

Continued from page 1

Proper X-Radiation Protection—Test Fixtures

In a color television receiver the primary sources of X-radiation are the picture tube, high voltage rectifier tube, and the shunt regulator tube. X-radiation can occur from the front or the rear of the picture tube. On test fixtures constructed from converted instruments (or otherwise homemade) it is desirable to have a protective shield over the rear of the tube; the type commonly used for automatic degaussing is best suited for this purpose. Installing a shield also improves purity and gives added implosion protection.

There are several X-radiation precautions that should be a basic part of your servicing procedure each time a chassis is bench-serviced.

1. Be X-radiation conscious at all times. Steps should be taken to assure the television chassis is *not* operated in excess of its *rated* high voltage.

2. As a standard operating procedure, regardless of the reason the chassis is serviced, provision should be made to measure anode voltage as soon as power is applied to the instrument. Since the X-radiation from the picture tube increases rapidly as high voltage increases, make sure high voltage is within the safe limit for the particular chassis type. In fact, it would be a good policy to adopt this as a standard servicing technique for your service shop. Measurement instruments for high voltage (and regulator, horizontal output current) could be installed as a permanent part of the test fixture. Remember, high voltage on a particular chassis may be correct when the chassis is installed in its "home" instrument; however, voltage may be substantially higher when the *same* chassis is connected to the test fixture on your bench.

3. When the chassis is returned to the customer and reinstalled in its permanent cabinet, *check the high voltage*. Also, check the action of the high voltage regulator: Monitor second anode voltage (for good regulation) while rotating the brightness control up and then down. This insures that your customer receives the protection initially engineered into the instrument.

4. Make sure accurate high voltage monitoring equipment is used—such as VTVM equipped with a high voltage probe. A properly calibrated voltage meter is required.

5. To avoid possible electrical *shock hazard* and exposure to abnormal levels of X-radiation, the high voltage compartment must be in place, the cover closed, and all metal shields in place whenever the chassis is operating. If a shield is missing from an incoming chassis, it should be replaced—before the chassis is serviced. Remember, there is *always a shock hazard* when high voltage is present.

6. Several precautions and/or servicing procedures should be used with the actual servicing of the chassis itself. All RCA Victor television instruments include

a shielded enclosure for the high voltage rectifier and the shunt regulator tube. Before power is applied to the instrument, be sure all shields are in place—to obtain maximum security from X-radiation. Another good servicing technique is to turn the brightness control up (run brightness at a high level) before power is applied: Turning brightness up will load the supply, keeping high voltage from exceeding normal levels—if the regulator tube happens to be inoperative. After regulator action is confirmed, adjust brightness for a normal level.

7. Pay close attention to the high voltage adjustment procedure as outlined in the Service Data for a particular chassis. This is an important point, for some television instruments—particularly color—require a different anode voltage for normal operation. For example, some instruments require 25 KV for proper operation, others require 24 KV, while smaller color chassis require 21.5 KV. It is good servicing practice to always check and adhere to the horizontal and high voltage adjustments as outlined in the Service Data. However, make sure you follow the correct servicing procedures for each individual set. *Do not* arbitrarily adjust the high voltage control without monitoring the voltage developed at the second anode of the picture tube.

Again, we wish to emphasize the most important safety points regarding bench servicing of television instruments.

A. Do not use any picture tube type without implosion protection in a test fixture (internal or external).

B. Re-evaluate your test procedures and fixtures to insure that you have included provisions for implosion, X-radiation, and shock protection.

NEW MARK 8 ATTACHMENT

Continued from page 1

Level Control Adjustment

For amplifiers requiring less than .3-volts input (RCA Victor stereo instruments equipped with tape inputs) the signal level from the MJC 26 may be reduced by adjusting a screwdriver LEVEL SET CONTROL located on the bottom of the attachment. To set the correct output level for use with RCA Victor stereo instruments, the LOUDNESS control on the instrument is set at its normal operating point. The level control on the tape attachment is then advanced until the desired loudness level is obtained.

RCA SALES CORPORATION

600 NORTH SHERMAN DRIVE
INDIANAPOLIS, INDIANA 46201

A RADIO CORPORATION OF AMERICA SUBSIDIARY

Trademark(s) ® Registered Marca(s) Registrado(s)

Copyright 1967—RCA Sales Corporation