

RCA

Plain Talk and Technical Tips

January, 1968 • Volume 11/No. 1

A New Look

You have probably noticed that beginning with this issue **PLAIN TALK and TECHNICAL TIPS** has adopted a distinctive new appearance. This re-design of typography and layout enhance the appearance and provide for easier reading.

In recent weeks you may have noticed in magazine or newspaper advertisements, that the familiar circular RCA emblem has vanished. In its place is a new RCA monogram that is as modern in appearance as tomorrow. At the time the new RCA logotype was announced, a program was started to modernize the appearance of all RCA advertising and publications—an example of this you are now reading.

Technical Training Programs

As today's (and tomorrow's) consumer electronics products become increasingly more complex the service technician's skill and ingenuity will be increasingly challenged. RCA Sales Corporation, recognizing the need for service training that will enable technicians to effectively service these products, is embarking on an expanded and continuous technical training program designed to accomplish this objective. In order to meet these needs the Technical Training Group is constantly developing programs and literature that are directed towards the servicing technician. This flow of information is specifically designed to simplify the complex. It is a fact that once a man understands the operation of a circuit, or mechanism, servicing it becomes a relatively easy task.

RCA has established a schedule to release a new training program every three months, consisting of two basic types. One will be product oriented with specific servicing approaches and techniques to be employed with a specific product. A program of this nature is now being presented by all RCA

Consumer Electronics Distributors. The other program type will cover basic circuitry and servicing.

CTC 22 Servicing

This program, entitled "**CTC 22 Servicing**" is of a workshop nature, where technicians watch a demonstration of servicing techniques, then have an opportunity to become proficient in each servicing operation demonstrated. Contents of this workshop program includes: color television setup, horizontal and high voltage adjustments, AFPC adjustments, RF and IF servicing, in addition to chroma bandpass alignment. The workshop is designed to familiarize the technician with all field adjustments and bench alignment techniques for the CTC 22 color chassis.

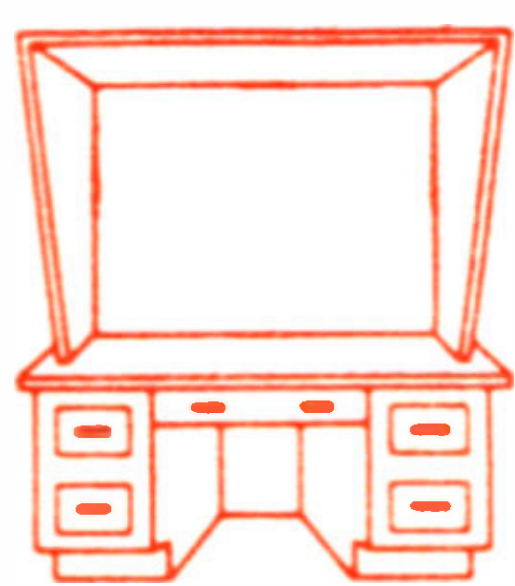
Automatic Color

Following the CTC 22 servicing workshop program, a color television workshop entitled "**Automatic Color**" was introduced. This program is designed to familiarize the technician with all as-

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Figure 1—Technical Training Meeting



A monthly publication for the service industry prepared by RCA Sales Corporation

CTC 22 Set Up Features

Color set up adjustments on the CTC 22 portable color chassis closely resemble their counterparts found on larger RCA color chassis. However, the compactness of this chassis has made it necessary to move some of the service controls to unfamiliar locations. These changes, coupled with a "blue gun down" color picture tube mounting arrangement, have slightly altered the color set up procedure for this chassis.

Tracking

All controls associated with black and white tracking adjustments are located on a special "controls" board — see Figure 2.

Tracking adjustments are accomplished by use of the three position service switch (normal, service, or raster), two drive controls and three screen controls. These adjustments are like those found on other RCA color chassis, although somewhat simplified because a kine bias control is not used on the CTC 22 chassis.

When the SERVICE SWITCH is placed in the "service" position to adjust the screen controls, the blue line may not be coincident with the red and green lines, but will usually be slightly lower on the screen. There will also be an extra (slightly bowed) horizontal blue line visible across the screen. This is normal reaction in the CTC 22 and should be disregarded.

Convergence and Purity

The convergence procedure used with the CTC 22 is similar to that used with other RCA color instruments; although the convergence board location, shape, and controls arrangement is entirely new. Figure 3 illustrates the circular-shaped convergence board. Notice that it is mounted on

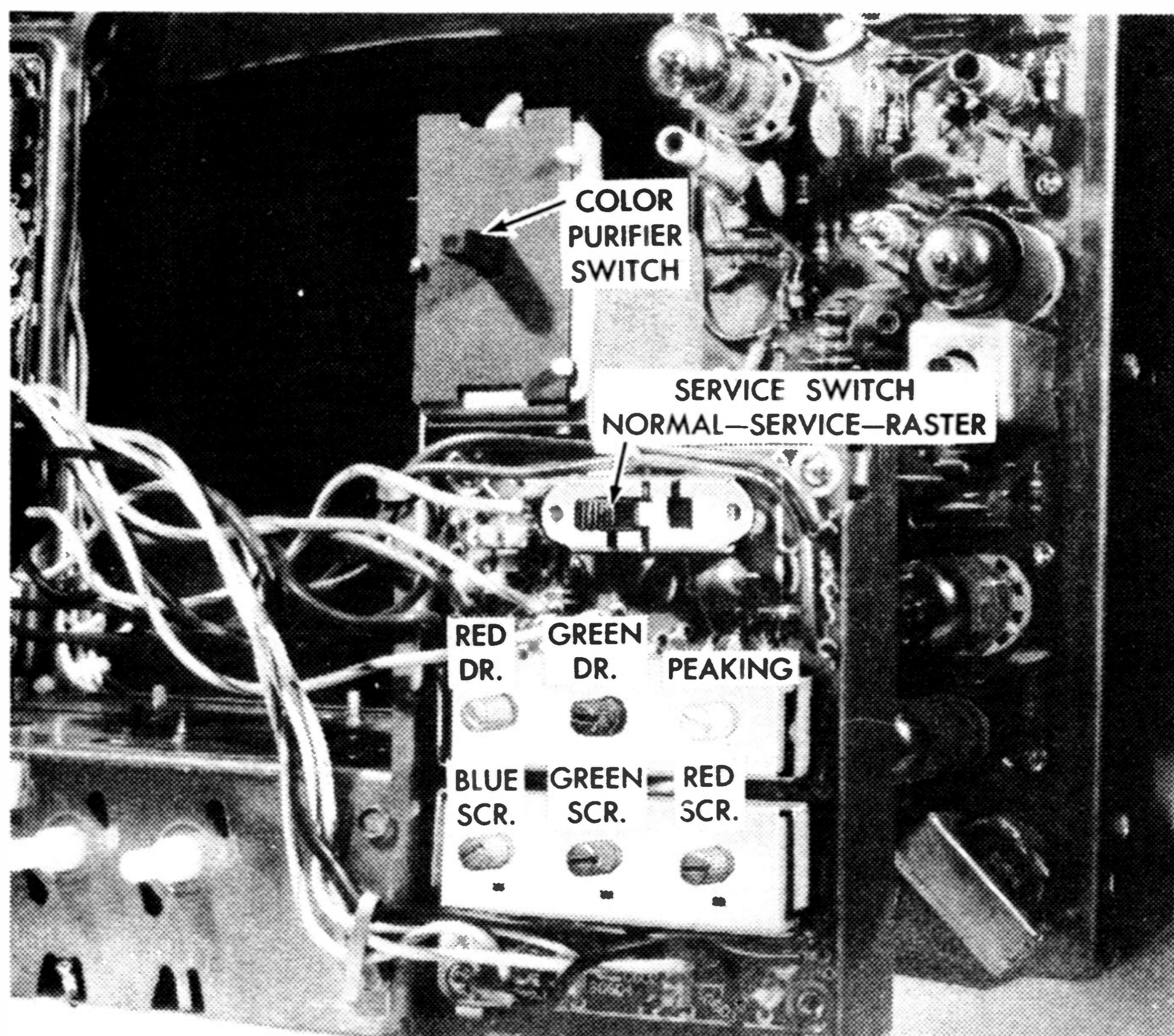


Figure 2—Set Up Controls Location

the neck of the picture tube. In addition to containing the dynamic convergence controls (12 as in other chassis) the board also serves as a mount for the convergence coils. The purity/blue lateral magnet assembly is identical to that used with other RCA 90° rectangular color picture tubes.

Because the color picture tube is operated with the blue gun down, the normal convergence procedure is slightly modified. The correct procedure is to adjust for blue convergence before red and green.

Purity

Purity adjustments in the CTC 22 follow a familiar procedure—with one exception. Normally the deflection yoke is pulled rearward to obtain maximum landing at the center of the screen. In this chassis, however, the yoke is pushed forward to adjust center purity. Once good center purity is obtained, the yoke is adjusted rearward to obtain overall purity and proper edge landing.

A new mechanical means is used in the CTC 22 to secure the deflection yoke within its housing. The procedure to free the yoke for movement follows:

- (1) Turn the 3/8" beveled nut slightly counterclockwise (frees yoke at front).
- (2) Loosen the 5/16" lock nuts, and "run" the thumbwheel nuts completely forward.

The yoke can now be moved in a forward, rearward, or circular direction.

Once the yoke is positioned correctly, reverse the above procedure: "Spin" the thumbwheels out until they are just "snug" against the housing, then tighten the lock nuts. Next, turn the 3/8" beveled nut clockwise to secure the yoke at the front.

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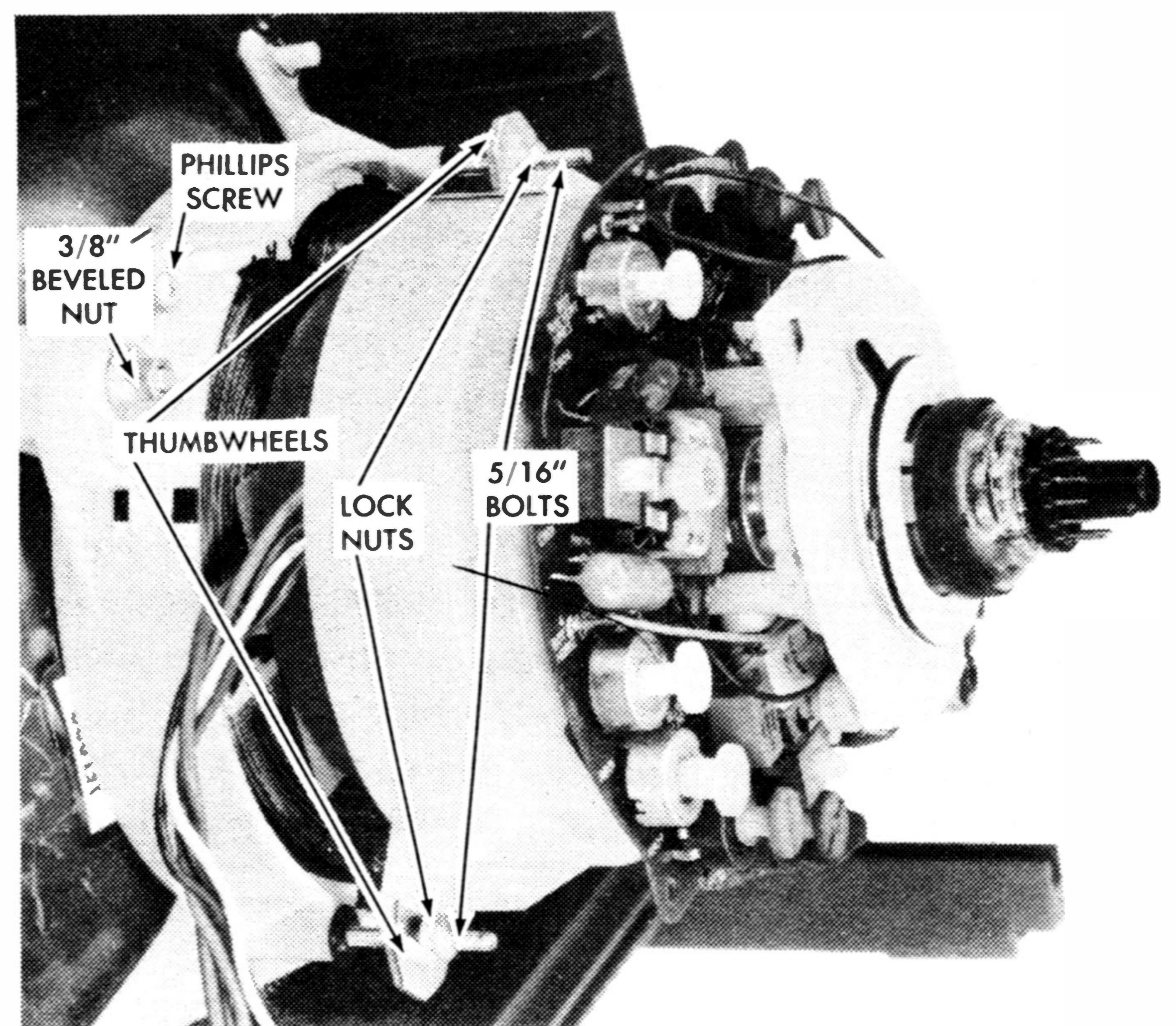


Figure 3—Deflection Yoke Adjustments



Solid State Servicing

Today's compact radio and television receivers are only possible because of the space and power savings offered by transistors. Because solid state devices are now common in home entertainment products it becomes very important that the service technician thoroughly understands all aspects pertaining to the servicing of solid state home entertainment products.

In many respects the techniques used in servicing solid state receivers closely parallel the familiar practices used in servicing tube type receivers.

Although transistors can be expected to be more reliable than vacuum tubes some failures must be expected. Generally, the transistor is soldered into the circuit making it somewhat harder to replace than a tube. Consequently good service techniques involve isolating the trouble to a particular section of the receiver. Once the defective component or transistor has been isolated it is a simple matter to replace it.

Servicing Techniques

When approaching a repair job, the first consideration should be; is the circuit receiving power? In the case of portable radios or televisions, it's possible that the batteries could be exhausted, battery terminals dirty or corroded, a broken wire or a related problem. If power is available, the problem is obviously elsewhere in the circuit.

The next step is to visually inspect the chassis or circuit board. This is especially important in small radios and other portable products that are subject to being dropped. If a thorough examination of the circuit board (under a magnifying glass if necessary) should reveal any unsoldered connections, breaks in the copper conductors on the circuit board or damaged components, these conditions should be corrected before proceeding further.

Signal Injection

After eliminating physical damage as a possible cause of trouble, the next logical procedure is to inject a signal. The best way to isolate the problem to a particular stage, is to start at the back of the receiver and work forward.

In the case of a radio, an audio signal is injected at the speaker. An output signal clears the speaker of any suspected fault. Audio section operation is determined by applying an audio signal at the input of the audio stages. Here again, signal output from the speaker indicates proper amplifier opera-

tion. An IF signal can be inserted at the detector, —output signal indicates the detector is functioning. Moving forward in the receiver, the IF stages can be cleared as a possible fault by injecting an IF signal at the input of the IF stages.

The receiver is operating properly through the IF, detector and audio stages if an output signal is obtained. Moving forward, in the chassis, an RF signal can be injected at the converter. An output signal at the point determines that the converter and all following stages are functioning properly. Finally in receivers employing an RF stage, the signal may be injected at the input of the RF stage or radiated into the antenna.

Failure at any one point to obtain an output indicates that the stage immediately following the signal injection point is inoperative — so the trouble has been isolated to that particular stage.

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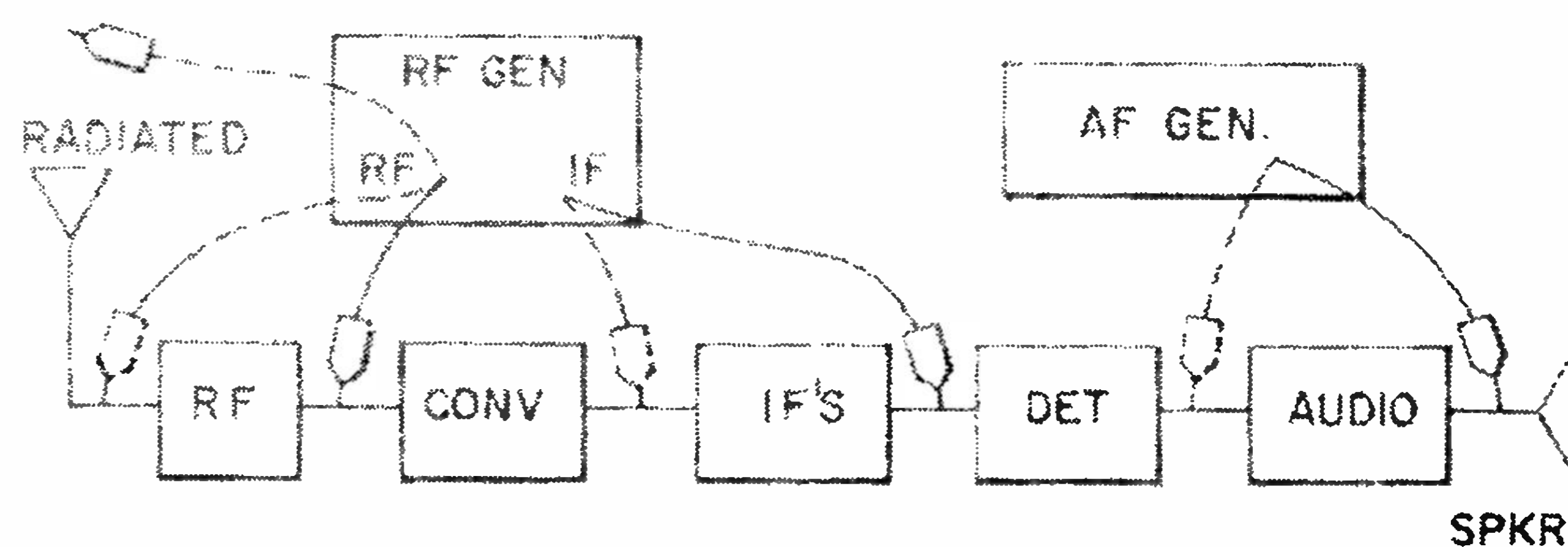


Figure 4—Signal Injection Technique

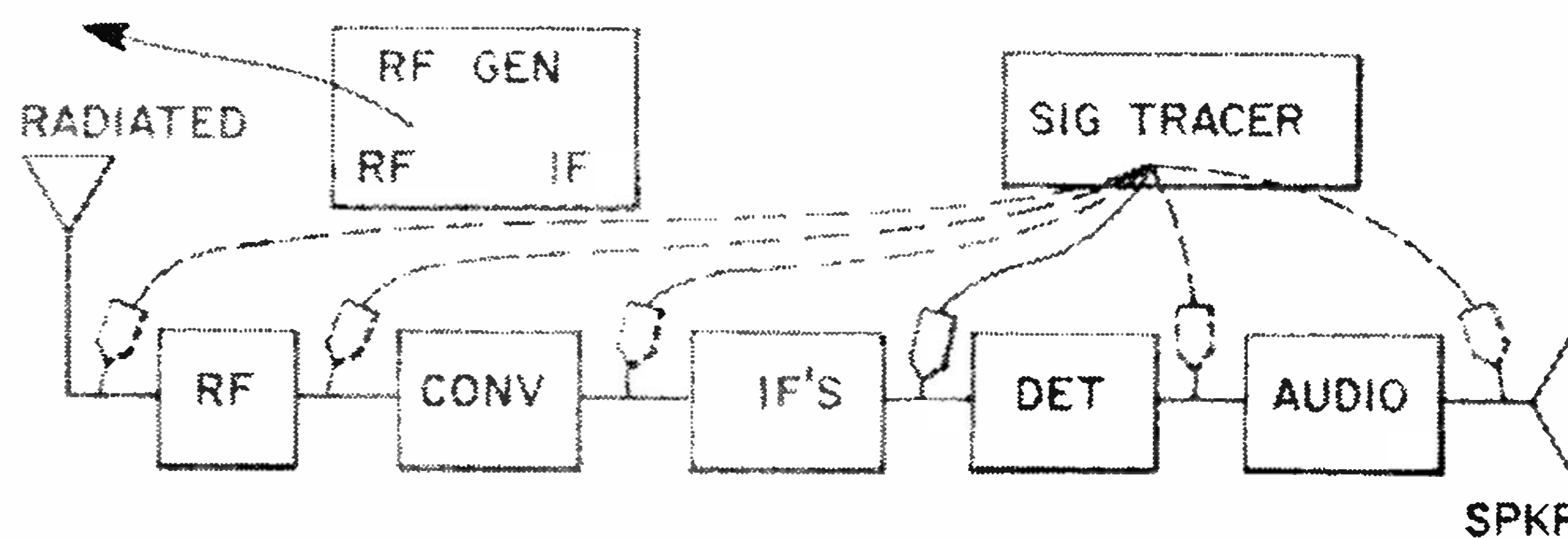


Figure 5—Signal Tracing Technique

Technical Training Programs

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pects of servicing the automatic color circuits used in present RCA color television receivers. The contents of the program include automatic chroma control (ACC), automatic frequency and phase control (AFPC), color killer operation, automatic fine tuning (AFT) and the motorized tuning system used in the deluxe Mark I series color instruments.

Solid State Training

The first "basic program" will be: **"Solid State Television—Circuits and Servicing."** This program is a taped slide/lecture presentation followed by a workshop demonstration where actual servicing techniques are investigated.

These programs have been developed to assist you in servicing RCA products. Remember, knowledge is the key to good servicing, so the time you spend in training is a valuable investment.

Information on how to participate in these, and future RCA Training Programs is available at the RCA Consumer Electronics Distributor in your area.

CTC 22 Set Up Features

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The Phillips head screw (see Figure 3) is a coarse (or rough) adjustment of the stationary yoke housing against the yoke. If the yoke housing cannot be tightened sufficiently to secure the yoke (with the beveled nut), use the following procedure: Loosen the 3/8" nut, and Phillips retaining screw. Now, squeeze the yoke-housing halves together to engage the next notched tooth in the housing. Tighten the Phillips head screw. Next, tighten the 3/8" nut sufficiently to keep the yoke secure inside the housing.

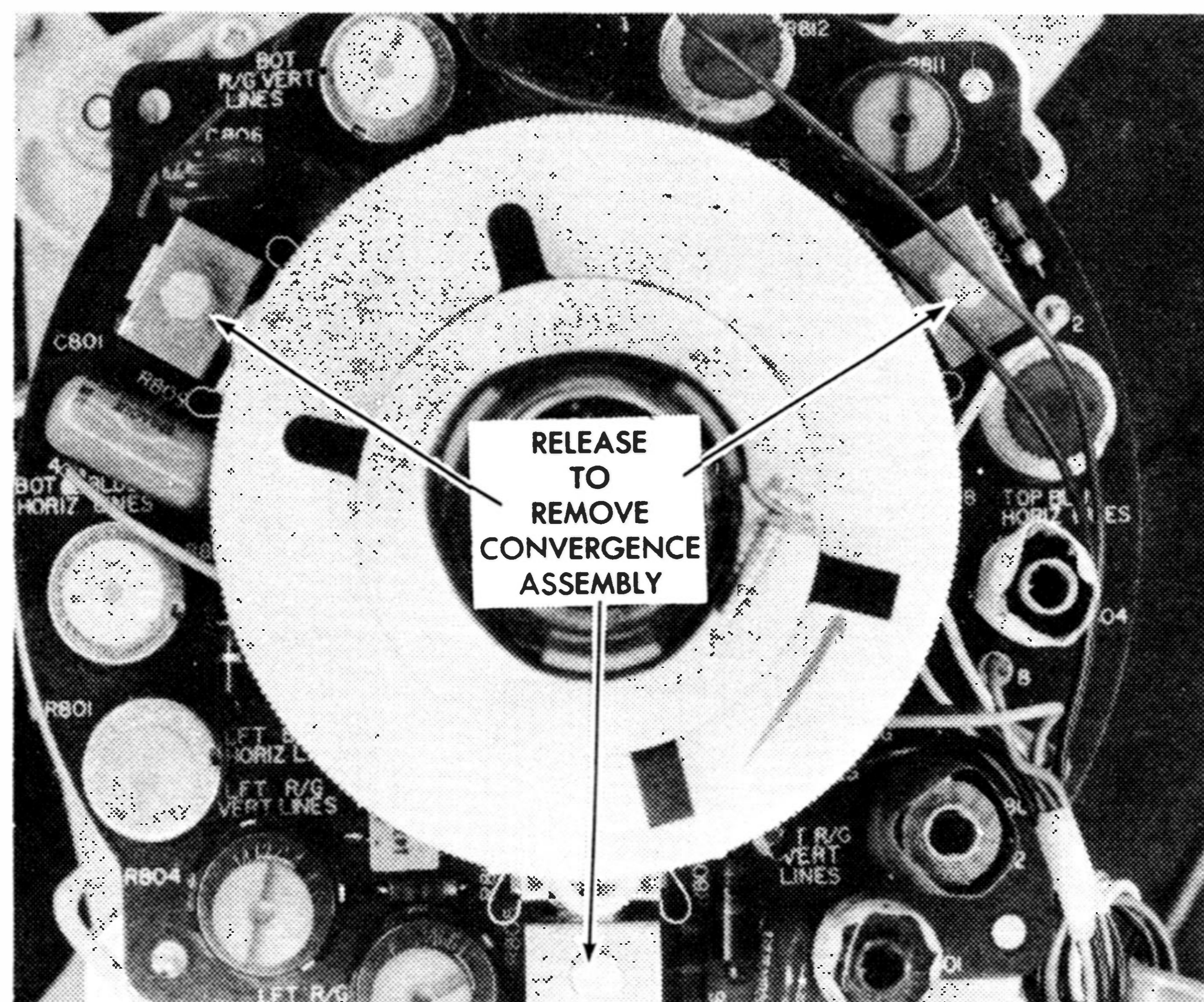


Figure 6—CTC 22 Convergence Controls

Solid State Servicing

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Signal Tracing

Signal tracing is another effective way to isolate troubles within a receiver. In this case an RF signal is radiated into the antenna and a signal tracing device such as a demodulator probe on the scope is used to determine the presence or absence of signal at various points in the circuitry.

This is best done by starting at the front of the receiver and progressing along the signal path from the antenna to the loudspeaker. Here again the receiver should be checked section by section. First check for signal at the output of the converter, next at the output of the IF stages, then at the detector, and finally at the output of the audio stages. After locating the section of the receiver that is malfunctioning, the same technique should be employed to follow the signal through each stage within the section, until the defective stage is isolated.

Although techniques for servicing radios have been discussed here, the same principles may be used with modifications to service nearly any solid state home entertainment period.

Shielding

Don't underestimate the importance of replacing tube and circuit shields in the tuner unit, picture I-F and sound sections of a television receiver. Carelessness in replacing or securing shields properly can lead to receiver performance problems such as interference beats in the picture, I-F oscillations, degraded pictures, distorted sound, and critical fine tuning.

Shields have an appreciable effect on the alignment of a receiver and are important to receiver performance. This is especially true in a color receiver. For example: neglecting to replace the shields on the I-F tubes of a color receiver in certain instances can change the I-F response enough to result in a complete loss of the color picture signal. This condition may go undetected when checking the color receiver on a black and white program.

Always check the circuit and tube shielding after servicing a television receiver. Make sure all shields are properly installed and properly grounded. Avoid an uncalled-for customer complaint.

RCA Sales Corporation

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Product Performance—Technical Training
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Indianapolis, Indiana
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