RCA

Plain Talk
and Technical Tips

Mar.-Apr., 1970 • Volume 13/No. 3-4

Color Television Alignment Workshop

RCA Technical Training recently announced **Workshop 7, Color Television Alignment Techniques,** another in a continuing series of color television training programs.

The new workshop program includes the training publication, **"Test Equipment—Book Two, Alignment Techniques."** This comprehensive study of the basic elements of color television tuning discusses the effects of bandpass upon receiver performance, some basic philosophy pertaining to methods of television alignment, and the test equipment used to align color television receivers. The text is intended to be studied by the service technician prior to his attendance at the workshop presentation.

The actual workshop program is designed to be presented to a group of approximately 6 technicians in a single 8-hour session. Using seventeen flipcharts, the workshop instructor first will review and discuss the operation of the test equipment required to align a color receiver. These instruments include the **sweep generator, marker generator, marker adder,** and the recently announced **WR-514A Chanalyst** television alignment generator which combines the functions of the three previously mentioned test instruments in one convenient package. While discussing test equipment, the instructor will demonstrate methods of checking out the operation of the test equipment prior to the actual alignment of the television chassis.

After discussing the test equipment and checkout procedures, the next phase of the workshop considers the necessary preliminary steps of alignment, such as disabling the vertical and horizontal deflection, and applying RF and IF bias voltages.

After preparing the chassis for alignment, the instructor will demonstrate an overall check of receiver RF and IF alignment from antenna to video detector, and also from antenna to the color demodulators. These steps will reveal whether alignment actually is needed, and if the misaligned circuits are in the tuner, the IF amplifier, or the chroma amplifier. Several flipcharts discuss the methods generally used to align the IF amplifier of a color television receiver.

Another phase of the workshop program deals with chroma alignment. After showing how the 4.5 MHz sound trap is set, the technique of "roughing in" the chroma-bandpass, using a 3.5 MHz sweep frequency, is taught. The final two flipcharts show how to prepare the chassis for chroma overall alignment using the video sweep modulation technique (VSM), or CSS with the new WR 514A.

(Continued on Page 4)

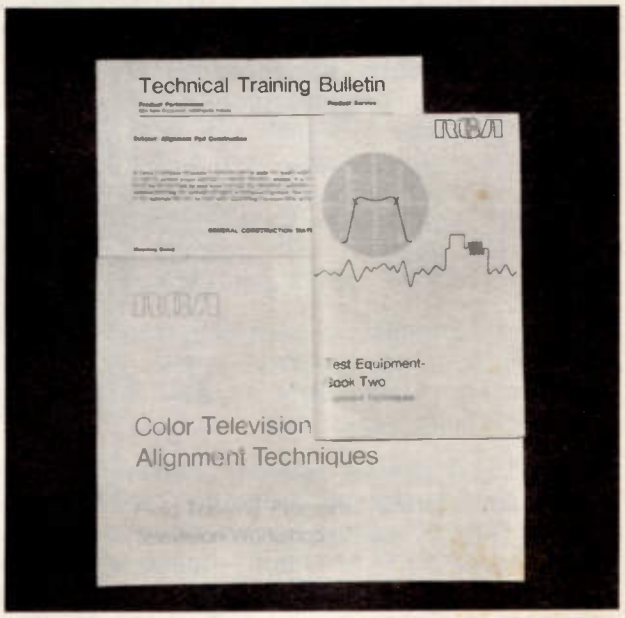

Figure 1—Workshop Book, Training Bulletin and Flipchart

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

Product Serviceability

Serviceability is more than just a word at RCA, it is a primary consideration in the planning of future products. Serviceability, along with quality and performance, are key words in the design and manufacture of RCA Radio, Phonograph, Television, and Tape products. Serviceability is an area of great interest to the service technician, because a product that can be efficiently serviced saves time and money for both the technician and his customer.

A committee of RCA Consumer Electronics Division personnel meets regularly to consider aspects of serviceability in the design of new RCA Consumer Electronics Products. The serviceability committee represents Design Engineering, Product Technical Services, Quality Control, and other product development personnel. The members of the serviceability committee are experienced in all areas of product servicing, and serve as an active voice that contributes much towards making RCA Consumer Electronics Products among the most serviceable in the industry.

Many ideas originating with the service technician are discussed in serviceability meetings, and are often incorporated in the design of RCA products. Many times, service technician's remarks to RCA distributors or RCA representatives are channeled back to the serviceability committee, where they are brought to the attention of the people directly involved in the planning of RCA products. All such remarks pertaining to serviceability are carefully considered, and used when the suggestion is proved advantageous. In some cases, when the application of an idea is not deemed immediately practical, it is often considered for future use.

The technician's ideas on servicing are appreciated, and every effort is made to consider these suggestions from all angles in an effort to produce the most serviceable and satisfactory product possible for both you, the service technician, and the ultimate owner of RCA products.

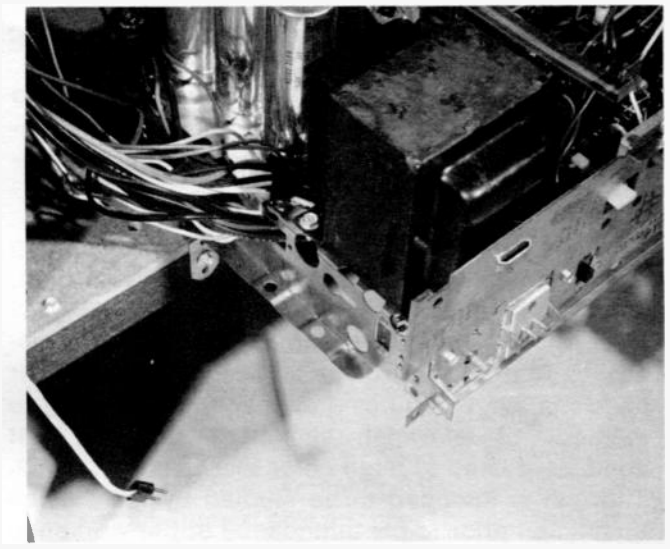

Figure 2—Slide-out Chassis for Serviceability

"Ceramic-Ferrite" Loudspeaker Magnets

Many RCA products use loudspeakers having a ceramic (ferrite) magnet structure rather than the customary Alnico V. Since the term "ceramic" suggests something made from potter's clay, and "ferrite" is the material used to make deflection yokes and high-voltage transformers, the reader may wonder how a combination of these materials could become a permanent magnet.

The word **"ceramic"** is generally associated with materials that are inorganic, hard, brittle, and formed at high temperature. Included in this family are coffee cups, vases, etc.

"Ferrite" is a special ceramic containing enough iron to exhibit magnetic properties. This magnetic ceramic (ferrite) can be compounded to be either magnetically "soft" or "hard"—these terms refering to the behavior of the magnetic material when subjected to a magnetizing field. If two pieces of ferrite, one "soft" and one "hard," are placed in a strong magnetic field and then removed from that field, the "soft" material will retain very little magnetism. The magnetically "hard" material, by contrast, remains strongly magnetized and may be used as the permanent magnet in a loudspeaker. Since "hard" ferrite and Alnico V are both good permanent magnets, either can be used in a loudspeaker if their basic differences are considered.

A magnet is somewhat like a battery in its ability to produce a magnetic field. A battery will produce

(Continued on Page 4)

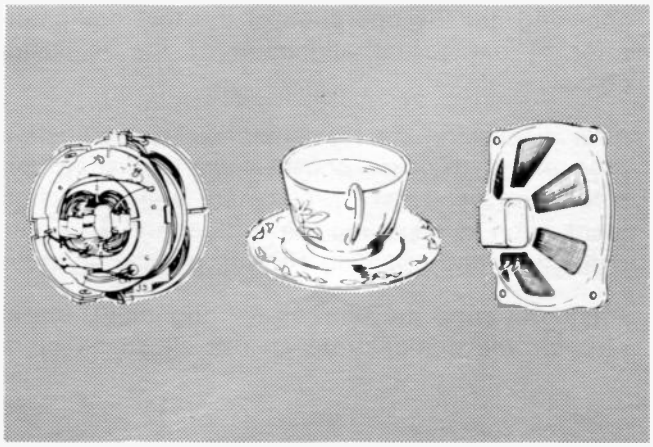

Figure 3—Ceramic Objects

Solid-State Master VoltOhmyst—WV-510A

The new RCA WV-510A Master VoltOhmyst® is a battery operated transistor electronic volt-ohm-meter featuring 21 megohms input resistance on all voltage ranges. The WV-510A features seven overlapping ranges for AC voltage, DC current, and resistance measurements. DC voltages are measured with good accuracy on an additional eight overlapping ranges. The WV-510A measures DC voltages from 0.01V to 1500V, direct current from .01 mA to 1.5A, AC/RMS voltage rfom 0.2V to 1500V, and AC peak-to-peak voltage of complex waveforms from 0.5V to 4200V p-p. Resistances may be measured, ranging from 0.2Ω to 1000 MΩ.

All voltage and resistance measurements are made with the single unit WG-401A probe that features extra flexible shielded cable, terminating in a BNC-type connector. A built-in switch converts the probe for either DC or AC/Ohms measurement.

The power supply for the WV-510A consists of a 1.5-volt "D" cell to power the ohms circuit and four 9-volt batteries (RCA VS 323 or equivalent) for the amplifier circuitry. Maximum battery life is assured by a trickle charge circuit for the 9-volt batteries that operates when the unit is used on AC power.

The WV-510A Master VoltOhmyst also features a large easy to read two-color mirror scale, and is housed in an attractive diecast aluminum case with a brushed aluminum panel. The light-weight (3½ pounds) battery or AC operated WV-510A will prove to be a valuable asset to the service technician for it may be used with equal convenience for either bench or in-home servicing.

Accessory Probes

The WG-301A Crystal Diode probe extends the frequency range of the meter up to 250 MHz. The probe is designed to slip on to the front of the standard voltmeter probe, eliminating the need for an extra cable.

The new slip-on WG-411 high-voltage probe may be used to measure DC voltages as high as 50,000V when using the WG-206 multiplier resistor having a value of 1090 MΩ.

A current measuring adaptor (WG-361A) is also available, permitting the WV-510A to be used for measuring direct current from 1 μA up to 5A in six ranges.

Figure 4—WV-510 Master VoltOhmyst

Loudspeaker Magnets

(Continued from Page 2)

a certain terminal voltage, and a magnet will have a certain **Magneto-Motive-Force (MMF).** To increase the voltage from batteries, it is necessary to use several connected in series. To increase the MMF of a magnetic material, it is necessary to increase its height.

Also, batteries have definite current capabilities. To increase current, several batteries may be connected in parallel. The magnetic analogy of current is **"flux,"** and to increase the flux from a magnet, it is necessary to increase the cross-sectional area.

Although both Alnico V and ferrite are commonly used for speakers, the different properties of the two magnetic materials result in different physical dimensions for equivalent magnets. The magnetic properties of Alnico V allows a magnet design having a height dimension about equal to the cross-sectional diameter. In contrast to this, the ceramic-ferrite magnet has a smaller height and the cross-sectional area is much larger. Thus where a "slug" of Alnico V was used, the magnetically equivalent ferrite magnet requires a "washer" or "doughnut" of ceramic material. In short, the ceramic magnet has a flatter but wider structure than the Alnico V equivalent.

So much for the differences—which is better? Alnico V is made from costly materials (Aluminum, Nickel and Cobalt) by a rather inexpensive process. The ceramic magnet, in contrast, is manufactured from inexpensive materials (iron-oxide and barium) by a rather costly process. Thus, small magnets are less costly when manufactured from Alnico V and large magnets are less expensive when ferrite material is used.

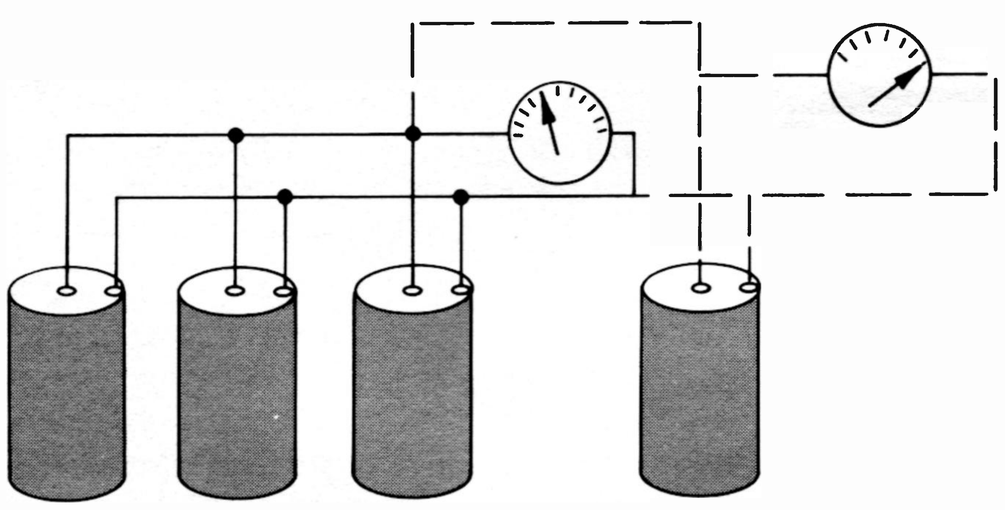

Figure 5—Current Analogy of Flux

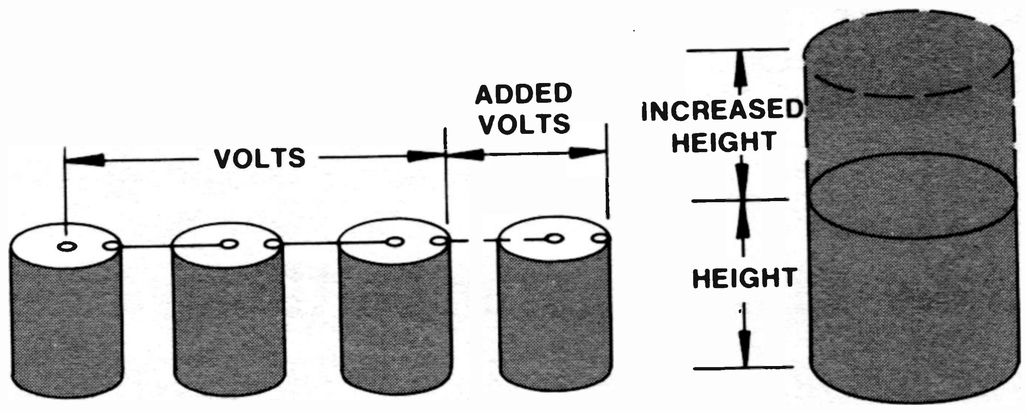

Figure 6—Voltage Analogy of MMF

Alignment Workshop

(Continued from Page 1)

Although the RCA CTC 40 chassis is used as the "vehicle" for this workshop, the familiarity with the test equipment and the procedures learned will be equally appropriate for use with other color television chassis.

Throughout the day of workshop activities, the participant will be given the opportunity to actually perform the alignment and checks detailed on the flipcharts. Each participant will receive a reduced copy of the flipcharts used for instruction and a **Technical Training Bulletin** describing the methods used for alignment pad construction.

RCA Sales Corporation
A Subsidiary of RCA Corporation
Product Performance—Technical Training
600 North Sherman Drive
Indianapolis, Indiana 46201