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RCA VICTOR SERVICE DATA

Several very valuable publications were included in recent mailings to RCA Victor Service Data subscribers.

One such issue, RCA Victor Television Service Data 1965 No. T1, is the annual Black and White Television Alignment Data. As you know, this is a compilation of the alignment procedure for *all* RCA Victor Black and White instruments from the beginning of the current subscription year to the present date. While this particular data is primarily intended as a "bench" reference, there are many interesting and important facts you should know about the publication.

1965 No. T1 contains the *latest revisions* in the schematic section. This includes engineering changes and schematic corrections incorporated after the distribution of the basic service data.

Detailed tuner information is also included in "T1"; valuable servicing hints with symptoms and possible remedies are given in chart form for each of the RF tuners.

The alignment information is more complete than ever with each alignment phase, i.e.: picture IF, tuner, sound IF, all in easy reading chart form for each of the chassis covered in the issue.

Alignment information for the KCS 153 (RCA's new transistorized television chassis) is also given in 1965 No. T1. You will find that the general alignment procedure for this new chassis is very similar to the familiar tube type black and white receivers.

Remember to keep your alignment data, "T1", handy — not only for use in actually aligning a television receiver — but for its valuable tuner information, helpful service hints, and fully up-dated schematics.

Another important publication recently distributed to RCA Victor Service Data subscribers is the "Remote Control" Data, 1965 No. T15. In this publication all of the current remote control information has been accumulated. Complete alignment procedures, latest schematics, along with pictorial views of the various

(Continued on page 2)

RCA SOLID COPPER CIRCUITS

Particular emphasis is placed on instrument performance and circuit reliability in RCA Victor products. RCA Solid Copper Circuits contribute to a great extent toward achieving greater dependability; scientifically controlled techniques insure uniformity of connections by precise control of soldering temperature and duration of heat applied throughout the assembly period.

Variations in lead dress and component placement which occurs in hand assembly is virtually eliminated in solid copper circuit design.

The solid copper circuit when mounted in the chassis proper lends itself to improved ventilation because chassis heat is not transferred to the components on the circuit board. This modern circuitry by RCA features excellent serviceability due to careful placement of components, clearly marked symbol numbers, many easily reached test points, ready access to pin connections of tube sockets and the highly legible "road-mapping".

The technician should be equipped with the proper tool and facilities to insure an efficient repair job.

Adequate lighting is just as important as having the correct service literature, hand tools and soldering equipment.

Solid copper circuitry is an advanced manufacturing technique; the service technician therefore in order to derive maximum benefit from a servicing standpoint must apply advanced servicing techniques.

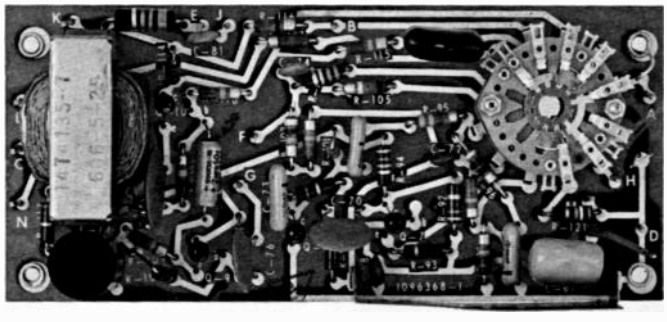


Figure 1. RCA Solid Copper Circuit

RCA VICTOR SERVICE DATA

(Continued from page 1)

motor assemblies are shown in this issue. Service hints in chart form are also shown which spell out many logical checks to make in the event of a malfunction.

The Remote Control Service Data and the Black and White Alignment Service Data should be given extra attention. Become familiar with their contents. Keep these issues on hand for use in conjunction with regular service literature.

Each mailing to RCA Victor Service Data subscribers contains service data for recently released RCA Victor Radio/"Victrola" and television products. In addition, regular monthly issues of "Plain Talk and Technical Tips" are included in the mailings — more recent issues were Volume 8 Number 8 covering RCA tape recorder products and Volume 8 Number 9 covering the new 19" color television receiver.

If you are not now on the RCA Victor service data subscription list check with your local RCA Victor Distributor for details — you will find it well worth your while — remember — a service job can be performed with less expenditure of time and effort when complete service information is available.

NEW 6BK4B

A new shunt regulator tube, designated as the 6BK4B is used in current RCA Victor color television receivers. This tube has a plate dissipation rating of 40 watts which will contribute to higher reliability. Pin connections and physical dimensions of the 6BK4B are the same as those of the previous 6BK4A type.

The 6BK4B may exhibit a darkening or "browning" of the glass bulb during service. This darkening effect is present to some extent with most tubes which operate at high temperatures; it is a *normal* condition and is not detrimental to tube life. Tubes should not be replaced because of glass bulb darkening or browning.

The 6BK4B may also show a blue glow on the upper half of the inner surface of the bulb wall; this effect is caused by fluorescence and is not to be mistaken for gas.

Another visible effect in the 6BK4B is a dull red color of the plate when the tube is operating near maximum plate dissipation (dark scenes or low brightness levels) again, a normal condition.

Special provisions are made in RCA Victor color receivers to properly ventilate, insulate, and shield the 6BK4B. Always exercise care when performing service work in the high voltage section of *any* television receiver and remember that visual observation alone cannot always be used to evaluate the condition of a tube.

KINE BIAS SWITCH

The "kine bias" control or switch is incorporated in recent RCA Victor Color receivers to permit the factory and the service technician to obtain the widest possible range of grey scale tracking despite variations in picture tube cut-off characteristics.

If the "kine bias" is fixed (or if the technician does not make use of the control) grey scale tracking can be obtained, however, the minimum to maximum brightness range must be established with screen control and background control settings and the results obtained will be dependent upon individual picture tube characteristics.

Picture tube cut-off characteristics should not be mistaken for emission level. In other words picture tubes can exhibit various cut-off points yet still have equal output levels.

Before a picture tube is replaced (in fact, before a picture tube is suspected as being defective) a complete setup should be performed which includes the setting of "kine bias."

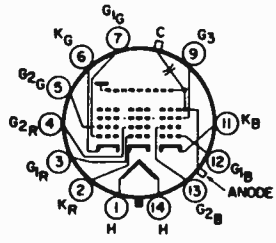
If a picture tube *is* defective (gassy, or low emission on one or more guns) the resetting of "kine bias" will not compensate for the condition.

In any case, especially in cases of "picture won't track," "picture tracks too high or too low," the "kine bias" switch or control should be employed as part of the setup to be sure the optium setting is being used.

19EYP22 90° RECTANGULAR COLOR PICTURE TUBE

The RCA 19EYP22 is a 19-inch rectangular glass picture tube of the triple-gun shadowmask type used in RCA 19" color television receivers. The screen has nearly straight sides with sharply rounded corners. A small neck diameter makes possible the use of a high sensitivity deflecting yoke.

This new tube has the "Hi-Lite" screen, utilizing a Rare-Earth Red-Emitting phosphor. An integral filter glass protective faceplate is used which is treated to minimize specular reflection.



Pin 1 and 14—Heaters
Pin 2—Red Gun Cathode
Pin 6—Green Gun Cathode
Pin 11—Blue Gun Cathode
Pin 3—Red Gun Control Grid
Pin 7—Green Gun Control Grid
Pin 12—Blue Gun Control Grid
Pin 4—Red Gun Screen Grid
Pin 5—Green Gun Screen Grid
Pin 13—Blue Gun Screen Grid
Pin 9—Focus Anode

Figure 2. 19EYP22 Basing Diagram

The heaters of the 19EYP22 are *series* connected internally; at 6.3 volts the current is 800 ma.

Basing connections are shown in figure 2.

SOLID STATE

KCS 153 HORIZONTAL OUTPUT OPERATION

The operation of the horizontal circuits of the KCS 153 is similar in many respects to a tube type circuit. One significant difference is the type of driving voltage applied to the horizontal output transistor. This waveform originates in the horizontal oscillator and is shaped in the horizontal driver; it then becomes the driving voltage at the base connection of the horizontal output transistor. The various waveforms in the horizontal output circuit of the KCS 153 are shown in the chart below. Yoke voltage and yoke current along with the various circuit conditions are given with reference to the progression of the sweep as it travels across the screen. As this chart is studied the action of the damper and output transistor along with the "fly-back" pulse can easily be compared to familiar tube type horizontal output systems.

Driving voltage—initially negative goes to plus 7 volts suddenly and lasts for 18μ sec, then returns to a negative voltage for the duration of the major portion of the sweep. Emitter voltage *must* be positive *and* driving voltage *negative* to cause output transistor conduction.

Yoke voltage—this also corresponds to the *emitter* voltage of the output transistor. Goes positive near the center of the sweep. At end of sweep "fly back" occurs producing a 250 Volt positive pulse of about 12 μ sec duration. Waveform then goes slightly negative for the first portion of the next sweep.

Yoke current—starts from zero at center of sweep—then builds to about 4 amperes at end of sweep. Current then suddenly reverses direction (fly back action) and decays from 4 amperes to zero as left side of sweep is formed.

Each portion of the developed sweep is related to a specific point on the face of the picture tube.

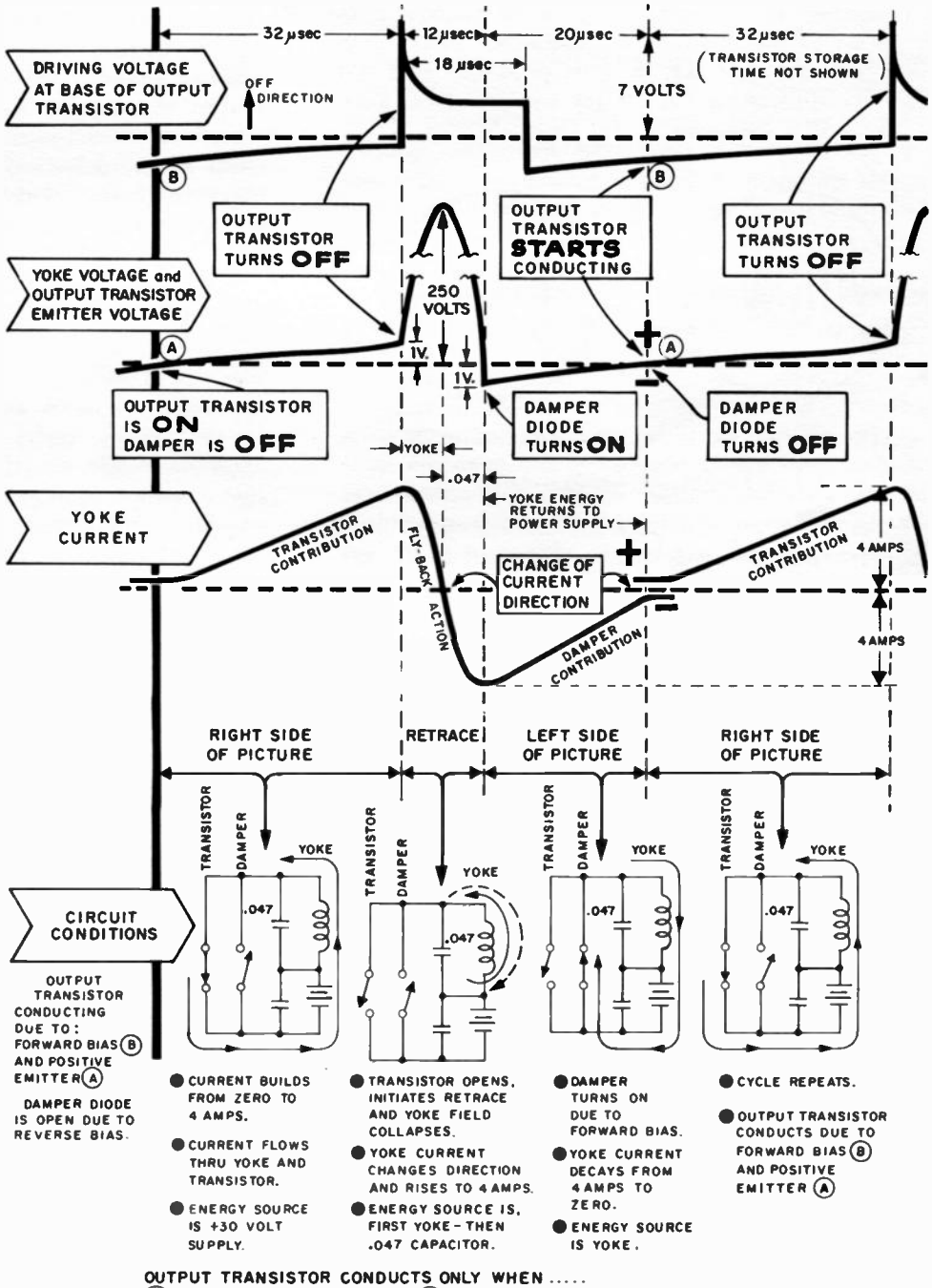
Transistor and Damper conditions are shown with each of the circuit configurations along with current paths as the sweep waveform is developed.

Notice that the first circuit configuration represents the conditions existing from the center of the sweep through to the right side. Output transistor ON, Damper Diode OFF.

At retrace time — Output transistor *and* Damper Diode are OFF —fly back occurs.

At full left side of picture—Output transistor is OFF and Damper Diode is ON.

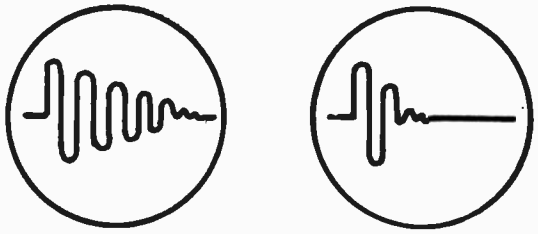
At the center of the picture the cycle repeats.



CHECKING DEFLECTION COMPONENTS USING AN OSCILLOSCOPE

A defective horizontal output transformer, yoke or coil in the deflection circuit of a television receiver can sometimes be difficult to diagnose. (Usually, substitution with a good component is the only sure method.) An open winding is easy to check but shorted turns can be evasive, resistance measurements are not always a conclusive test.

The following method of checking horizontal deflection components will indicate shorted turns without removing the component from the circuit and with the receiver turned "off". The individual component (or complete horizontal deflection system) is connected to an oscilloscope probe with a pulse (supplied by the oscilloscope) connected to the same point. A waveform can then be produced that will look like illustration "A" if the component is good, or "B" if it is defective.



(Illustration "A") (Illustration "B")

Figure 3—Oscilloscope Waveforms

To obtain the pulse from an oscilloscope a small modification is necessary that will not affect the performance of the oscilloscope.

Remove the "GROUND" binding post on the front panel that is farthest from the vertical input attenuator.

Enlarge the hole in the front panel and replace the binding post using fiber washers to insulate it from the panel.

Connect one end of a 680 mmf. capacitor (RCA Stock No. 76479) to the binding post. The other end is connected to one of the following points depending on the oscilloscope model.

RCA Oscilloscope	*Connect Capacitor to—*
WO-91A	Pin 3 (or 8) of V9 12AX7
WO-88A	Pin 3 (or 8) of V8 12AU7
WO-78A, B	Pin 3 (or 8) of V14 6BQ7
WO-58A	Pin 3 (or 6) of V8 6SL7GT
WO-56A	Pin 3 (or 8) of V10 12AU7

After modification, be sure to change the label on the modified binding post from "GROUND" to "SWEEP".

To check a component, connect the oscilloscope probe to one end of the coil and the ground lead of the probe to the other end. Connect a lead from the "SWEEP" binding post to the oscilloscope probe. Adjust the horizontal sweep frequency of the oscilloscope according to the following table.

Component	*Sweep Rate*
Width Coil	2500/5000 cycles
Horizontal Linearity Coil	2500/5000 cycles
Horizontal output Transformer	500/1000 cycles
Deflection yoke	2500/5000 cycles
Receiver deflection circuit with yoke connected	2500/5000 cycles
Receiver deflection circuit with yoke disconnected	500/1000 cycles

A complete receiver deflection system may be checked by removing the plate cap of the horizontal output tube and connecting the oscilloscope probe and the "SWEEP" lead to the cap lead of the transformer. Connect the ground lead of the probe to the receiver chassis. One shorted turn of the horizontal output transformer will produce the short, damped waveform characteristic of a defective component. The effect of shorted turns may be seen by shorting the filament winding of the horizontal output transformer while checking the transformer with the oscilloscope.

THE SCHEMATIC "INSERT"

RCA Victor television receivers are equipped at the time of packing with a plastic envelope containing an instruction book and other pertinent information for that specific model. A small size "insert" schematic diagram of the electrical circuit is also included in this envelope. This schematic diagram is intended as an aid for the customer and the service technician in the event service is required and no other literature is available. While this "insert" is of value in identifying tube functions, and circuit arrangements, it should be used only as an expedient and not considered as primary service information.

Complete service information is found only in the RCA Victor Service Data for each particular chassis: this literature is made available to service technicians through the local RCA Victor Distributor and to Service Data subscribers immediately after the product is distributed to the retail dealers.

The "insert" schematic can be very handy, since it reflects circuitry of specific production runs, but don't overlook the importance of having *complete* information—Check with your local RCA Victor Distributor about getting on the Service Data subscription list.

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