PLAIN TALK AND Technical Tips

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SERVICE DATA HIGHLIGHTS

Several interesting and important issues of service data have been distributed in recent mailings to RCA Victor service data subscribers. It is always good practice to review service data before filing so that it can be used to best advantage when the occasion for reference arises.

Some highlights of these recently distributed publications are reviewed in this article.

1964 No. T1, Second Edition

This service data is a completely revised edition of the earlier 1964 No. T1. As you know, 1964 No. T1 covers the alignment procedures for all RCA Victor black and white television instruments. The second edition, which supersedes the first edition, is expanded to include more detailed coverage of UHF alignment, service hints for all current VHF tuners, and a complete series of updated schematics covering all 1965 black and white chassis including the new KCS 152 chassis along with the new KRK 123 tuner. Also, alignment and servicing of black and white remote control receivers has been added in this service data.

Of particular interest in Service Data 1964 No. T1, Second Edition is the treatment given to the alignment and servicing of VHF and UHF tuners. A valuable table of troubles and remedies is presented for each of the tuners; various trouble symptoms are described and probable causes are spelled out to assist the service technician in pinpointing malfunctioning circuitry in the tuner. A trouble-remedy reference is also included for remote control servicing.

Be sure to check your files to make sure you have the *second edition* of 1964 No. T1—discard the first edition.

1964 No. T9

This service data is designed as a technical reference for the new KCS 152 chassis. It includes a complete schematic, parts list, and specifications on the new 16" portable black & white television instrument. For alignment information, 1964 No. T1 is used.

1964 No. 21

This Radio/"Victorola" service data is of special significance since it covers the Solid State AM/FM tuner, the RC-1218 and the companion amplifiers, the RS-209 and RS-211. Circuit diagrams with significant voltages indicated are furnished to enable the service

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THE KCS 152 16" PORTABLE

The new lightweight 16" portable RCA Victor television instrument is available in two models, the AF-020 and AF-021. These models feature the slanting control panel containing the UHF tuning control, VHF channel selector, off-on-volume, and brightness controls. The speaker is situated directly under the carrying handle which is also mounted to the inclined panel. A monopole VHF antenna and a loop type UHF antenna are mounted on the rear of the cabinet; provisions are made for both external UHF and VHF antennas.

These portables utilize the KCS 152 chassis, which incorporates a power transformerless circuit and employs several new tube types especially designed for operation at lower B+ supply voltages. A single circuit board contains the major portion of the receiver circuitry.

A brief description of the circuit features of the KCS 152 chassis is given in the following paragraphs.

Antenna Input Connections

When an external 300 ohm antenna is connected to the VHF antenna terminals, the VHF monopole (brown lead) should be disconnected and the white

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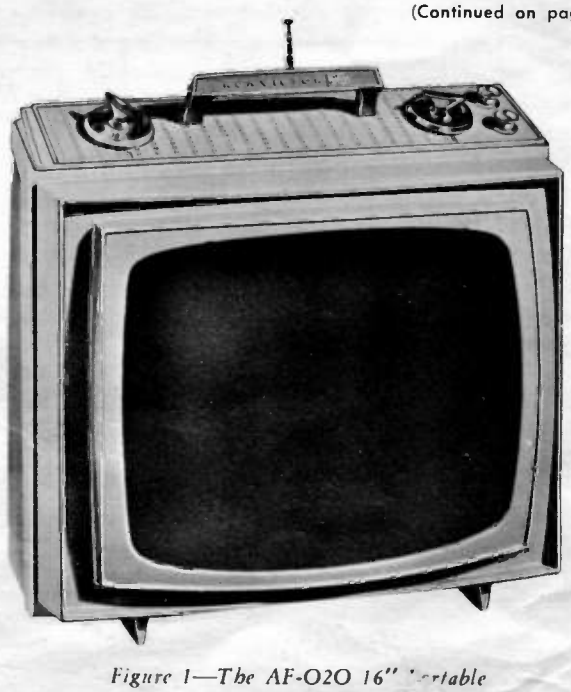

Figure 1—The AF-020 16" Portable

THE KCS 152 16" PORTABLE

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lead coming from between the two VHF terminals should be connected to the bottom screw terminal.

An antenna transformer (Balun), with its associated capristor, is physically located on the receiver antenna terminal board. This balun provides for the required impedance match from the VHF antenna terminals to the 75 ohm unbalanced VHF tuner input.

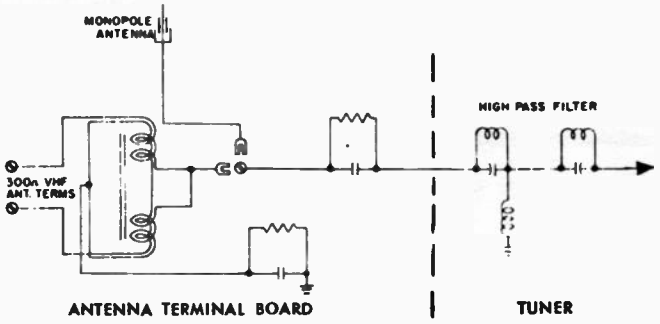

Figure 2—KCS 152 Antenna Input Circuits

When the monopole antenna, furnished with the instrument, is used, it should be connected (brown lead with spade lug) directly to the screw terminal at the bottom of the instrument antenna terminal board which is connected through a capristor and a 75 ohm cable to the input terminal of the VHF tuner.

The UHF antenna input terminals are connected directly to the 300 ohm input of the UHF tuner. Always disconnect the UHF loop antenna before connecting an external UHF antenna.

Power Supply

A simplified schematic of the power supply used in the KCS 152 is illustrated in Figure 3. The filament wiring circuitry is not shown for purposes of simplicity. Note that it is a half wave circuit delivering a B+ of 150 volts.

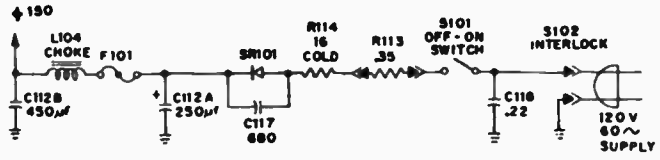

Figure 3—KCS 152 Power Supply

Vertical Circuit

The vertical circuit of the KCS 152 utilizes the 15KY8 novar tube as the oscillator and output. The yoke windings are impedance coupled from the *primary* of the vertical output transformer. The secondary of this transformer simply supplies feedback to sustain oscillation and provide for vertical retrace blanking.

Horizontal Circuit

The horizontal oscillator of the KCS 152 employs a stabilized multivibrator (8FQ7) and a 22JU6 is used as the horizontal output stage.

Local Oscillator Adjustment

Only two adjustments are required to track the local oscillator of the KRK 123 tuner over the entire VHF range. The adjustment procedure is as follows:

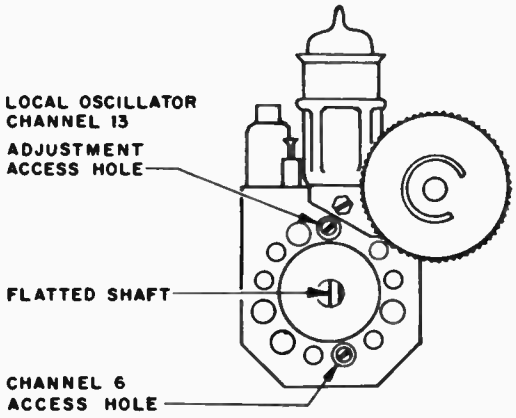

Figure 4—Local Oscillator Adjustments

Set the fine tuning control to the approximate center of its range, switch tuner to the highest channel that can be received in the high VHF band (Channels 7-13). Remove the VHF channel selector knob, and adjust channel 13 oscillator coil for best picture and sound. Without disturbing fine tuning, switch to the highest channel available locally in the low band (Channels 2-6). Adjust channel 6 oscillator coil for best sound and picture. The thumbwheel fine tuning control is sufficiently broad that all available stations can then be tuned.

Spot Optimizer Magnet

A "spot optimizer" magnet is used on the neck of the 16AYP4 kinescope. This magnet is similar in appearance to an ion trap, however, it affects picture *detail* instead of picture brightness. Adjustment of this magnet is not critical and need be made only when a new kinescope is installed or the magnet has been moved.

To adjust the spot optimizer magnet:

Use a crosshatch or dot pattern and set brightness so that the crosshatch lines or dots are visible on the raster.

While observing the pattern in the center portion of the screen, adjust the spot optimizer magnet for a symmetrical halo surrounding the lines or dots. Greatest effect of the magnet will be observed in the upper center section of the kinescope face.

If a dot-bar generator is not available, the magnet may be adjusted as follows:

Turn the channel selector to a non-operating channel which displays the greatest amount of noise or "snow." While observing the snowy raster, adjust the spot optimizer for greatest detail in the vertical center line portion of the screen.

New Tubes Used

Several new tube types which give high performance are used in the KCS 152 chassis. Adequate signal gain and contrast range is accomplished through the

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TRANSISTOR REPLACEMENT

Due to the high reliability of the transistor, failures in normal use seldom occur. Consequently, when servicing malfunctioning transistor circuitry, the service technician must make sufficient checks to determine the specific stage in which the trouble exists. Further tests must then be made to localize the component which may be at fault. These tests are best performed first through the use of signal tracing techniques and then by employing the usual voltage and resistance checks.

When it is suspected that a transistor is defective, the technician should remove the transistor from the circuit and check the unit in a transistor checker. In instances wherein a transistor checker is not available the technician must analyze the resistance readings of the transistor junctions with an ohmmeter. The transistor can be visualized as two diodes connected back-to-back; using this analogy the front-to-back resistance reading of each junction can be compared against a known good unit.

Caution—never use an ohmmeter which applies a voltage exceeding the transistor's ratings. On most 20,000 ohms/volt multimeters the RX100 range is generally suitable. Also, be careful not to change ranges when comparing forward and reverse resistance of a given junction—use the same RX100 range even if the needle deflection is at the high or low end of the scale. In figures 5 and 6 the manner in which a

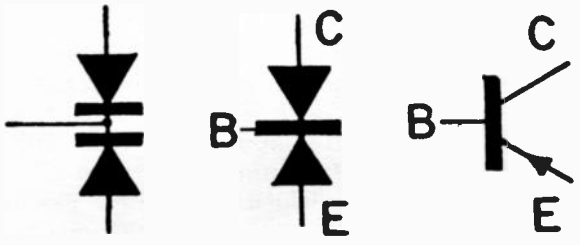

Figure 5—Two Diodes Compared to P-N-P Transistor

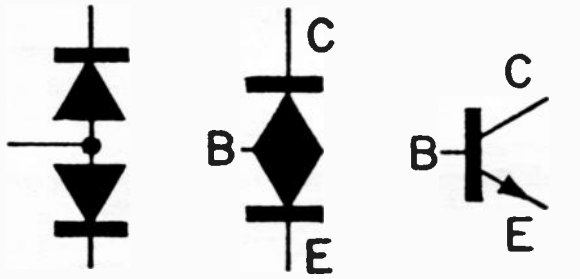

Figure 6—Two Diodes Compared to N-P-N Transistor

transistor may be compared to two diodes is illustrated. Remember that such resistance readings are only approximate and must be evaluated by the technician based upon readings obtained from good transistors.

When replacing a transistor, it is strongly recommended that the *exact* type number be used. Often, the transistor will have a color dot or suffix letter or number following the type number; this is a coding which classifies the transistor as to "Beta" or gain groupings. In order to maintain the original performance characteristics and balance this coding should be observed.

In certain cases such as in push-pull output circuits a transistor failure in one circuit location may cause the companion transistor to fail. Be sure to check for this possibility when replacing output transistors. While it may not be necessary to replace transistors in "pairs" in all cases, it is advisable to check for distortion or unbalance to determine whether both transistors should be replaced.

Care should always be used in making solder connections to transistors. Application of excessive heat, or prolonged application of a properly heated soldering tool to a transistor lead or terminal can permanently damage the device. Always observe the following precautions in soldering to a transistor lead or terminal.

1. Always solder as far as possible from the body of the transistor.
2. Never, under any circumstances, apply molten solder or a hot soldering tool to a lead or terminal at a point closer than 1/16 inch to the body of the device or for longer than 10 seconds.
3. Use the smallest available soldering tool—preferably one specifically intended for use with transistors or miniature circuit components.
4. Make sure that the surfaces to be soldered and the tip of the soldering tool are adequately tinned and cleaned so that the connection can be made as quickly as possible.
5. Always grip the lead or terminal to be soldered with a pair of long-nose pliers at a point between the intended solder connection and the case or body of the transistor. This precaution allows the pliers to act as a heat sink and to conduct heat away from the internal elements of the device.

Transistors should not be inserted into or withdrawn from the circuits with the power on because high transient currents may cause permanent damage to the transistors.

The metal shells of most power transistors operate at the collector voltage. Attention should be given to the possibility of shock hazard and electrical short circuiting when the metal shells of these transistors operate at voltages above or below ground potential. When such output transistors are removed or replaced make sure that all the original mounting components —such as the mica insulating spacer (with appropriate application of silicon grease to both sides) and insulating spacer washers—are installed with the replacement type.

NEW KCS 152

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use of a frame-grid RF amplifier, two frame-grid IF amplifiers in addition to a frame-grid video output tube.

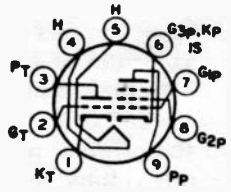

Figure 7—11LQ8 Basing Diagram

An 11LQ8, a triode-pentode, is used as the video output (pentode section) and the AGC tube (triode section). This is a 9 pin miniature type; the pentode section is of frame-grid construction and is especially designed for video output service.

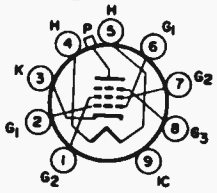

Figure 8—22JU6 Basing Diagram

A 22JU6 novar type beam power tube is used as the horizontal output in the KCS 152. The suppressor grid is brought out to a separate pin terminal (pin number 8) for connection to "snivet" control circuitry.

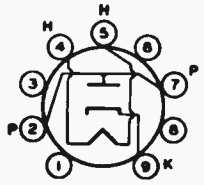

Figure 9—17BS3 Basing Diagram

The damper tube, 17BS3, is another of the new tubes used in the KCS 152 chassis. This tube is also a novar type with a 450 ma., 17 volt heater; a controlled warm up time of 11 seconds is designed into this tube.

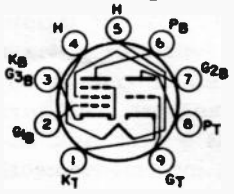

Figure 10—15KY8 Basing Diagram

The 15KY8 is used as the vertical oscillator and vertical output tube in the KCS 152. This novar tube contains a triode section and a beam power pentode section especially designed for use as vertical oscillator and output respectively.

Since the KCS 152 chassis utilizes series connected heaters, all tubes are of the 450 ma. controlled warm up type.

Picture Size Adjustments

The KCS 152 deflection circuits are so designed that a full raster (both vertically and horizontally) is maintained over a wide range of line voltages.

A well-equipped service shop should have some means of varying the line voltage on one or two outlets to facilitate adjustment and servicing of deflection circuits. A factory-set width adjustment is used on the KCS 152; if adjustment is required, set brightness and contrast to maximum, use a line voltage of 108 volts AC, then adjust the width control until the raster just fills the screen horizontally. This procedure insures that AGC action as well as picture size will be correct over normal ranges of line voltages.

Vertical height and linearity adjustments are made in the usual manner to obtain correct proportion.

Detailed specifications, parts list and schematic information for the KCS 152 appears in RCA Victor Service Data File: 1964 No. T9. Cabinet disassembly and reassembly along with picture tube removal and safety glass cleaning procedure is covered in this service data.

The KCS 152 with its 16" picture tube, power transformerless circuitry, and the single circuit board make for a compact, light weight portable instrument; yet all circuit areas are fully accessible for ease in adjustment and servicing.

THE KRK 123 RF TUNER

The KRK 123 RF tuner is especially designed to work with the KCS 152 chassis. It is a 3-circuit tuner using a frame-grid 3GK5 RF amplifier, and a 6KZ8 mixer/oscillator. In the UHF position the circuitry is connected in such a way that the tuner becomes a two-stage, 40 mc. IF amplifier to accommodate the output of a separate factory-installed UHF continuous tuner.

Fine tuning is accomplished with a knurled "thumbwheel" and local oscillator adjustments are required on Channel 6 and Channel 13 only.

A unique feature of this tuner is its 75 ohm input and the absence of a balun on the tuner proper. When a monopole antenna is used, it couples through a 75 ohm cable directly to the input to the tuner requiring no imepdance transformation. A 300 ohm outdoor antenna may be used in which case a balun mounted on the antenna terminal board provides the impedance match.

SERVICE DATA HIGHLIGHTS

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technician to perform normal adjustments and servicing of these chassis.

To get the most from your service literature, be sure your file is complete and take time to review the overall contents of each service data *prior* to filing.

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