PLAIN TALK AND Technical Tips

RCA VICTOR

VOL. 9
NO. 1
JANUARY, 1966

a monthly publication for the service industry prepared by:

PRODUCT PERFORMANCE
RCA SALES CORPORATION

RCA BATTERY OPERATED TAPE MECHANISMS

When performing service on a tape recorder, a knowledge of the basic mechanism is very important. Although the principle of operation might be similar in many recorders, there are variations in the manner in which drive is furnished to the various moving parts.

In November 1965, Plain Talk and Technical Tips covered the RCA 7" reel to reel mechanism; and the December issue covered the RCA tape cartridge transport. This issue covers the RCA battery operated tape mechanisms.

The simplified illustration of Figure 1 shows the mechanism of the RCA YGS 11 tape recorder as it

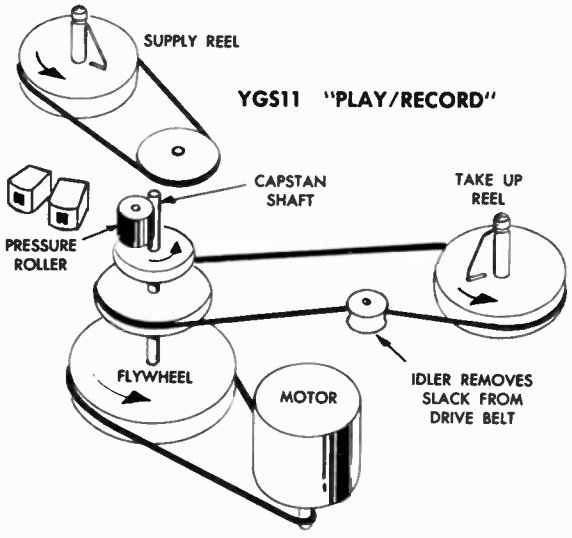

Figure 1 — The YGS 11 Mechanism In Play or Record

applies to either the "play" or "record" positions. Notice that a drive belt is used to couple the motor to the flywheel, and the flywheel assembly to the take up reel. The pressure roller and capstan shaft "pinch" the tape providing the primary driving force to propel the tape past the play/record heads. The take up reel accumulates the tape since it is driven by a drive belt from which slack has been removed by the action of an idler pulley. The supply reel feeds the tape and

(Continued on page 2)

THE KCS 136G 21" CONSOLETTE

The new KCS 136G chassis recently introduced, is used in three consolettes, models CG 223, CG 225, and CG 229. The KCS 136G is transformer powered, using three picture IF stages; the picture tube is a 114° 21FVP4. The KRK 124 and KRK 120 VHF-UHF tuner combination is used in this new chassis.

Two silicon rectifiers are used in the DC power supply, and a manual reset circuit breaker is included. The heater filaments are wired in parallel; filament power is obtained from a 6.3-volt secondary winding on the power transformer. Two main filament branches are used, and each branch is protected by a #28 AWG wire fuse.

The chassis layout of the KCS 136G is similar to the KCS 136M (23") chassis. Two "Solid Copper Circuit" boards are used. All customer operating controls are accessible from the front of the cabinet. Controls for horizontal hold, vertical hold, and contrast are located (recessed) in the lower right section of mask; thumbwheel adjustment knobs are provided.

Controls for brightness, on/off/volume (pull-push), fine tuning and VHF-UHF channel selection are mounted on the Tuner Mounting Assembly. VHF channel numbers are marked on the control knob; UHF channels are indicated by a numbered dial-pointer system. The Tuner Mounting Assembly (sepa-

(Continued on page 4)

Figure 2 — RCA Victor Model CG 223

RCA BATTERY OPERATED TAPE MECHANISMS

(Continued from page 1)

turns counterclockwise by means of the pull of the tape. Constant tape speed is maintained by a governor in the motor and the inertia of the flywheel.

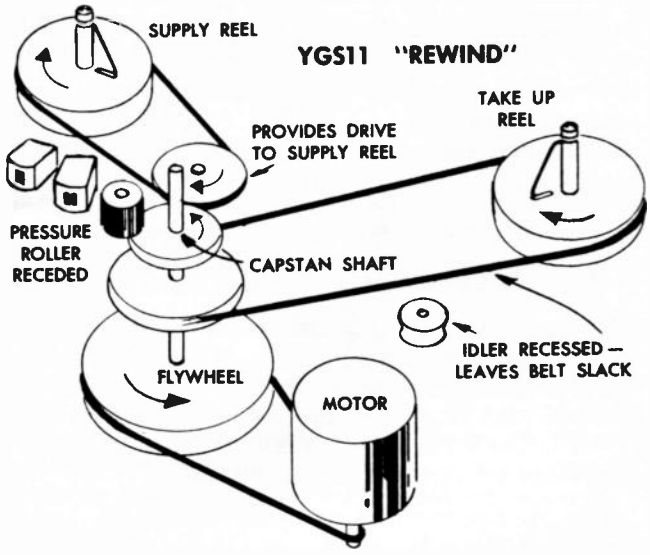

Figure 3 — The YGS 11 Mechanism In Rewind

When the recorder is in the "rewind" position the drive conditions change. Referring to Figure 3, note that the pressure roller is receded from the capstan shaft, the idler pulley is recessed leaving the belt to the take up reel slack, and the pulley coupled to the supply reel is now in contact with a pulley on the flywheel assembly. Under these conditions, the capstan and pressure roller no longer provide driving force to the tape; instead, the *supply reel* is now the primary drive for the tape since it is driven in a *clockwise* direction by way of the flywheel assembly. The take up reel also turns clockwise (this is possible due to the slack in the belt) giving up the tape for accumulation on the supply reel. In this manner the rewind function is accomplished.

In the RCA YGS 21 tape recorder mechanism a different method of drive is used. The illustration of Figure 4 shows the basic components as applied to the play or record positions. Notice that rim-to-rim drives are employed rather than the belt drives of other mechanisms.

The motor is placed in a horizontal plane and by spring action the motor shaft drives the rim of the underside of the flywheel. An idler wheel is in contact with the outer rim of the flywheel and the rim of the take up reel. The supply reel is free to turn since it is disengaged from the mechanism. In the play or record position of this mechanism the main drive for the tape is again provided by the "pinch" action of the pressure roller and capstan shaft. The take up reel having a built-in slip clutch accumulates the tape as it leaves the capstan. The supply reel feeds the tape and turns counterclockwise by the pull of the tape. Constant tape speed in the YGS 21 is provided by an electrical voltage regulation system which maintains uniform motor speed throughout the useful life of the batteries.

When the YGS 21 is placed in the rewind position, the conditions are as shown in Figure 5. The idler which furnished drive to the take up reel is now disengaged, the pressure roller and capstan shaft are separated which permits the tape to travel in the reverse direction (right to left). Power is applied to the supply reel by reason of its inward motion coming in rim-to-rim contact with the flywheel.

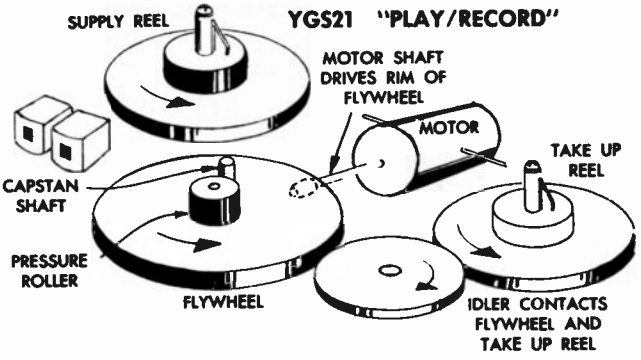

Figure 4 — The YGS 21 Mechanism In Play or Record

The tape is then accumulated on the supply reel at a fast rate which constitutes the rewind function.

By understanding the principle of operation of a tape recorder mechanism, the service technician can determine at what points a mechanical difficulty can occur. Driving surfaces, whether belts or rims must be clean and free of lubrication, moving parts should be lubricated as directed in the service literature. Tape

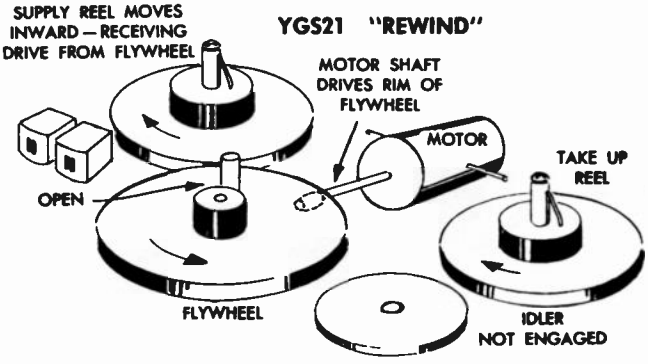

Figure 5 — The YGS 21 Mechanism In Rewind

heads must also be clean to insure good electrical performance.

More detailed information, specifications, and parts lists are given in RCA Victor Service Data File Number 1965 No. 26 for the YGS 11 and File Number 1965 No. 27 for the YGS 21.

VERTICAL DEFLECTION — KCS 153

Transistors now perform all of the necessary functions of vertical deflection in a transistorized television set since the frequency of operation and the power required in this circuit are well within the capabilities of modern transistors. Most of the circuit refinements in a practical transistor television vertical circuit are concerned with obtaining a high degree of stability and good linearity.

The vertical circuits of the RCA Victor KCS 153 chassis consists of a vertical oscillator (synchronized with incoming vertical sync pulses), a "pre-driver" stage, a "driver" stage and a vertical output stage.

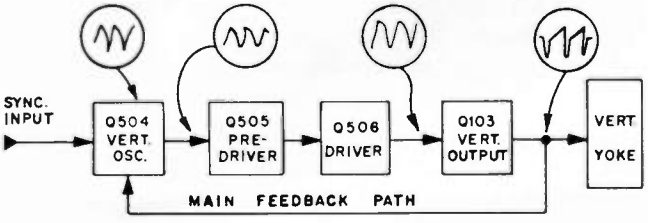

Figure 6 — Block Diagram KCS 153 Vertical

The oscillator and output transistors work as a feedback system and are grounded emitter circuits. The pre-driver stages are DC amplifiers which are "emitter followers" or common collector circuits. A very linear rise in current through the vertical deflection yoke windings is accomplished by this vertical deflection system.

The vertical oscillator can be considered as a "switch", which is CLOSED at retrace time and OPEN during vertical scan time.

Oscillation is sustained by positive feedback from the yoke to the base circuit of the vertical oscillator.

OFF time, or that time during which the oscillator transistor is open, is controlled by the large time constant in the base circuit of the oscillator—this corresponds to sweep time. ON time of the oscillator occurs when the voltage on the base of the vertical oscillator becomes lower than the emitter. This happens quickly, and lasts for a very short duration—this is vertical retrace time.

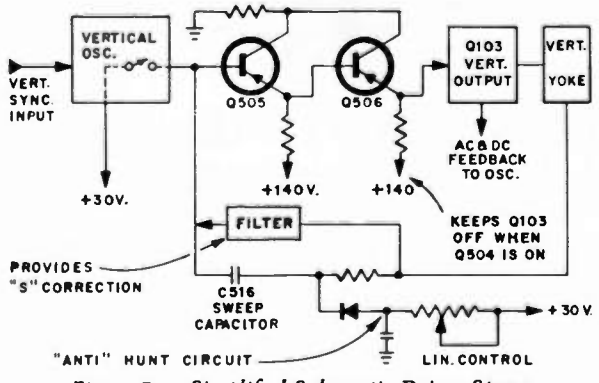

Figure 7 — Simplified Schematic Driver Stages

The switching action is utilized at the collector of the vertical oscillator to quickly connect the sweep capacitor to +30 V at retrace time and permit a linear decrease in voltage on this capacitor during SCAN time or while the oscillator transistor is OFF.

The pre-driver and driver stages perform the function of isolating the vertical output stage from the sweep capacitor charging circuit.

The sweep capacitor during retrace time is discharged rapidly due to the 130 volt flyback pulse. During scan time, the capacitor starts a gradual exponental build up, however, this build up is "linearized" by the feedback from the output transistor, which tends to keep the charging current constant. This produces a very linear voltage rise.

The output transistor then drives an impedance matching auto-transformer to feed the deflection yoke through a DC blocking capacitor.

Other circuit features of the KCS 153 vertical circuit include a VDR across the output transistor which protects it from the large flyback pulse. A VDR is also used to stabilize the bias voltage of the oscillator transistor.

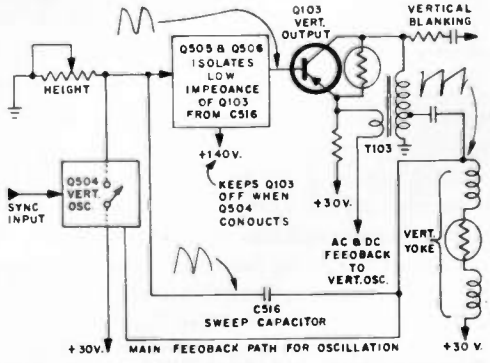

Figure 8 — Simplified Schematic Vertical Output

The overall performance of the vertical circuits of the KCS 153 chassis delivers a linear, stable vertical scan. Circuit refinements insure good noise immunity, freedom from line voltage variations, independence from varying transistor characteristics, and full control of the vertical sweep waveform with the usual height, linearity and hold controls.

Service can be performed on transistor vertical deflection circuits by using signal injection. The circuit can be treated as a 60 cycle amplifier and when 6.3 volts AC is fed through a blocking capacitor (5μf to 10μf) to various points an isolation to a particular stage can be made. Voltage and resistance readings are then used to further isolate a component.

RF TUNER HINTS

A simple three step procedure should be followed when performing normal maintenance on RF tuners. First, the tuner contacts should be cleaned, then a careful visual inspection should be made to determine the need for any repairs, and finally all contacts and moving parts should be carefully lubricated.

The cleaning operation should be done with full access to the tuner contacts using a small brush moistened with "chlorothene*", a non inflammable, nontoxic cleaning agent. Do not rotate the tuner switches until the cleaner is dry and the tuner has been relubricated.

Minor repairs of loose, broken, or damaged contacts can be made during and after cleaning at which time a thorough visual inspection is possible.

Always relubricate switch rotor blades and stationary contacts with a light application of Rycon grease No. 2-EP.

Use only approved type cleaners and lubricants, careless cleaning methods can often result in damage to plastic parts, switches, and special components.

RCA Victor Service Data Number 1965 File T1 contains detailed information regarding RF tuner repair and alignment.

Check with your local RCA Victor distributor's service manager for additional tips covering recommended tuner servicing procedures.

*"Chlorothene" is a product of the Dow Chemical Co.

SERVICE DATA INDEX

Subscribers to RCA Victor service data recently received the latest index. Identified as "Volume III" the new index covers RCA Victor Television and Radio/"Victrola" instruments from 1961 through 1964.

The index cross references model numbers to service data number; chassis number to service data number; and sales name to model number. In addition, a Service Tip index and Parts Tip index is included.

Another section of the index lists record changers by service data number and by model number. Cartridge and styli identification is also given.

To provide for quick identification the Volume III index is printed on pink paper. Volume II (yellow paper) covers instruments from 1958 through 1960. Volume I (printed on green paper) includes instruments from 1945 through 1957. These publications provide a complete Service Data reference for all RCA Victor home instrument products from 1945 through 1964. All three volumes are currently available through RCA Sales Corporation, Consumer Relations, Building 1-206, 600 North Sherman Dr., Indianapolis, Indiana 46201.

THE KCS 136G 21" CONSOLETTE

(Continued from page 1)

rate from the chassis) is mounted in the cabinet; for transportation and other servicing operations, the assembly can be attached in the "service" location provided on the chassis. Controls located on the rear apron include vertical linearity, width control and a three section AGC/sync stability/height control assembly.

The KCS 136G chassis features both vertical and horizontal blanking. An isolated winding on the width coil (see Figure 9) returns to the control grid

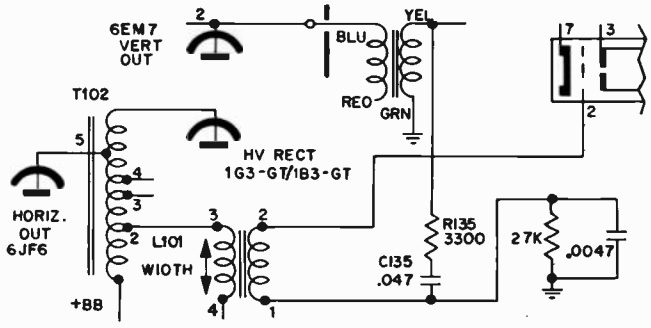

Figure 9 — KCS 136G Blanking Circuit

circuit of the picture tube. Vertical *and* horizontal blanking pulses use this winding as a common signal path to the picture tube grid: Horizontal blanking pulses are obtained by inductive coupling from the primary of the width coil; vertical pulses are taken by way of an RC circuit from the secondary of the vertical output transformer.

The new chassis has three sound stages — 6HF8 sound IF (triode section), 6HZ6 detector/audio amplifier, and 6HG5 output. A 6" x 4" speaker is used.

Other features of the KCS 136G include a noise-immune, keyed AGC stage (6GY6), 6AV6 sync separator, and dual-diode (selenium) horizontal AFC.

The use of a 21" picture tube in conjunction with the basic KCS 136 chassis makes possible a compact consolette instrument. High performance and attractive cabinet design will make this a popular instrument.

RCA SALES CORPORATION
600 NORTH SHERMAN DRIVE
INDIANAPOLIS, INDIANA 46201
A RADIO CORPORATION OF AMERICA SUBSIDIARY