

WR-69A TELEVISION/FM SWEEP GENERATOR ADJUSTMENTS

General

Performance of the WR-69A depends upon the quality of the components employed. If it should be necessary to replace any of the component parts, only RCA replacement parts or equivalents of those shown in the Replacement Parts List of this instruction booklet should be used.

The chassis may be removed from the case by removing two screws from the bottom of the front bezel, removing the bezel by sliding it off the bottom and lifting upward, removing two screws from the back of the case, and removing 14 screws from around the edge of the front panel. Pull the panel and chassis out of the case.

If any alignment adjustments are made, the line voltage should be 117 volts at 60 cps. If trouble is encountered, voltage readings should be taken and compared with the operating voltages shown on the schematic diagram. Conventional trouble-shooting techniques should be used to locate trouble.

Circuit Description and Operation

The WR-69A utilizes five electron tubes, including the power rectifier, as shown in the schematic and block diagrams. V1, an RCA-6J6, serves as the swept oscillator in a push-pull circuit which supplies a balanced rf output signal. TV-channel frequencies are changed by switching inductances. C1 is a vibrating capacitor driven by the motor, M1. The SWEEP-WIDTH control, R36, varies the amount of voltage fed to the motor, thereby affecting the sweep width.

During TV and FM operation, the output of V1 is coupled through the attenuator network to J1. When the CHANNEL selector is switched to "IF", the V1-oscillator circuit operates at a frequency of approximately 120 Mc. Part of this voltage is coupled into the mixer stage, V3. V2 is a beat oscillator which is tunable, by means of C15, over the range from approximately 120 to 170 Mc. The signal from V2 is also fed into the mixer stage, V3. Output from V3 is fed into the cathode-follower output stage, V4, and the beat-frequency difference signal is filtered out and made available at the IF/VF OUT connector.

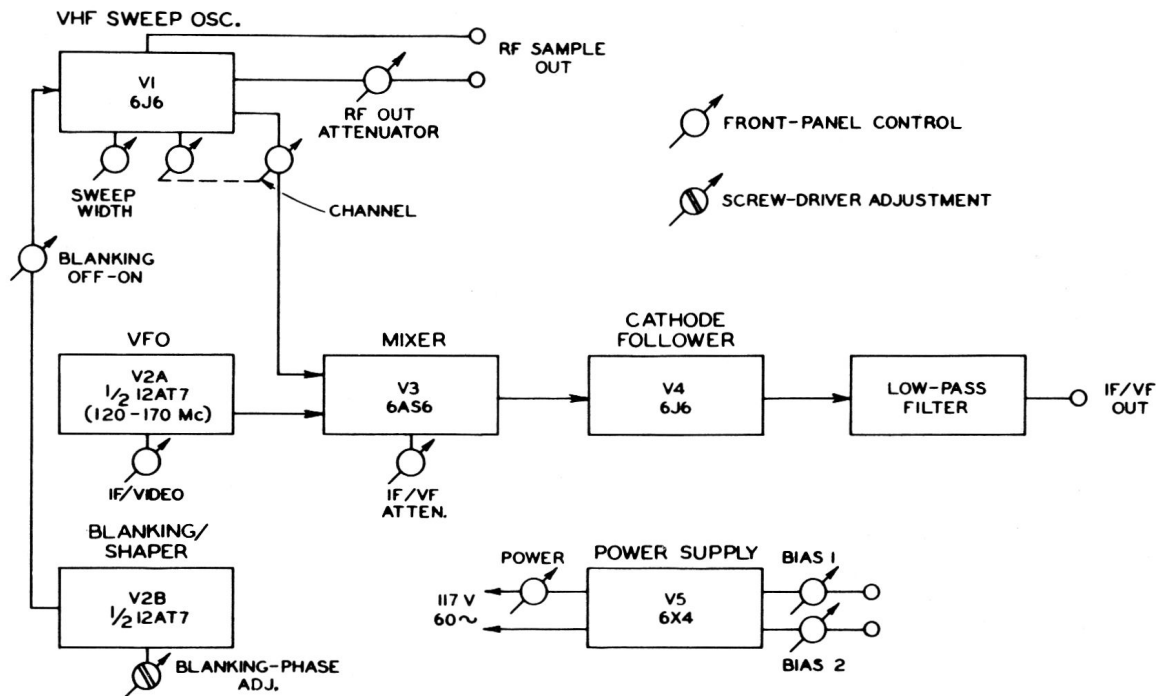


Figure 10. Block diagram of RCA WR-69A.

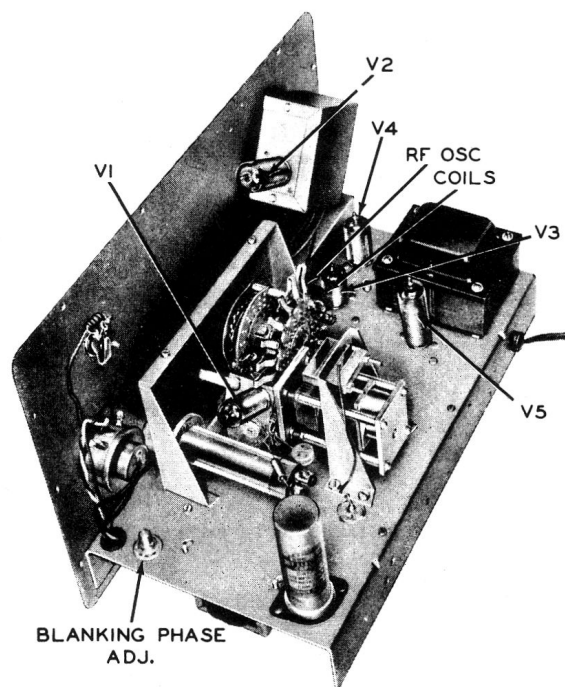


Figure 11. Inside view of RCA WR-69A. Internal shield over oscillator section has been removed.

V2B is a blanking/shaper stage which provides return-trace blanking of the sweep signal when the BLANKING control is set to "ON". A negative blanking pulse, generated and clipped to resemble a square wave, is applied to the grids of V1 through capacitor C11. Potentiometer R39 and capacitor C34 comprise an adjustable phase-shift network to permit proper phasing of the blanking pulse with the excursion of the vibrator capacitor. R39 is factory set to the correct position.

Blanking-Phase Adjustment

The internal blanking phase adjustment, R39, is accessible on top of the chassis (see Figure 11). Adjustment of this control requires a test setup like that shown in Figure 12. With equipment connected as shown, set the WR-69A to deliver a swept signal on one of the TV channels. Set BLANKING to "ON". Adjust the marker generator to deliver an output signal in the center of the channel.

Adjust R39 to a point which will center the vertical blanking line which is nearest to the two pips exactly between the pips (see Figure 13B). The two pips may appear to the left or right of center. Turn the BLANKING control to "OFF" and adjust the phase control on the oscilloscope to merge the two pips into one, as shown in Figure 13C. Set the WR-69A BLANKING control to "ON". A pattern similar to that shown in Figure 13D should be obtained. The blanking-phase control is set correctly when the marker pip can be

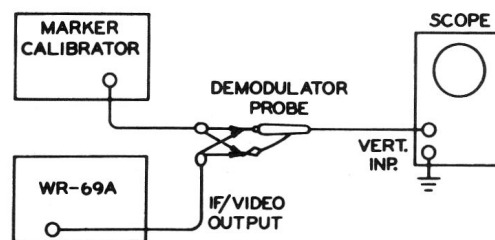


Figure 12. Test setup for checking blanking-phase adjustment.

moved across the trace and made to disappear at either end without producing a double pip.

Channel-Frequency Adjustment

Channel-frequency adjustments require a test setup like that shown in Figure 14. With equipment set up as shown, adjust the SWEEP WIDTH control on the WR-69A to deliver a sweep signal approximately 5 Mc wide on channel 13. Adjust the phasing control on the oscilloscope and set the BLANKING control on the WR-69A to "OFF". Tune the marker generator to deliver an output signal in the center of the channel frequency.

With a pair of plastic pliers, adjust the channel 13 strap inductor by squeezing the two sides together. Squeeze the strap to position the marker in the center of the trace. Reset the sweep and marker generators to channels 12 through 8, successively, and adjust the strap inductors for each channel as described above. On channels 7 through 2, adjust the coils by spreading the turns with a sharp bladed alignment tool.

RF-Balance Adjustment

This test provides a check of the rf-output signal across the balanced output cable. A demodulator circuit, such as that contained in the RCA WG-291 or WG-302A Demodulator probes, is required in conjunction

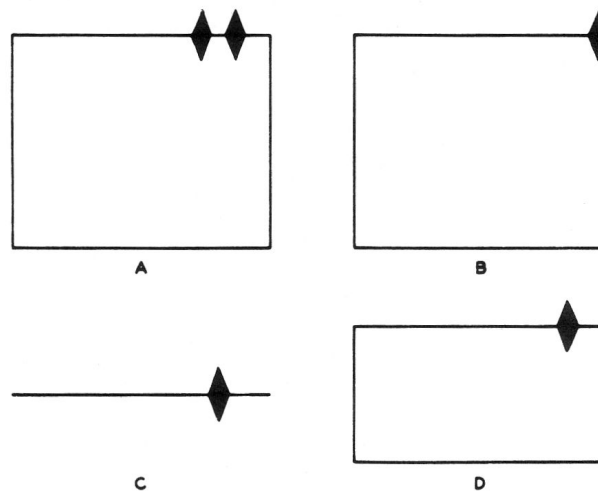


Figure 13. Marker positions during blanking-phase adjustment. See text.

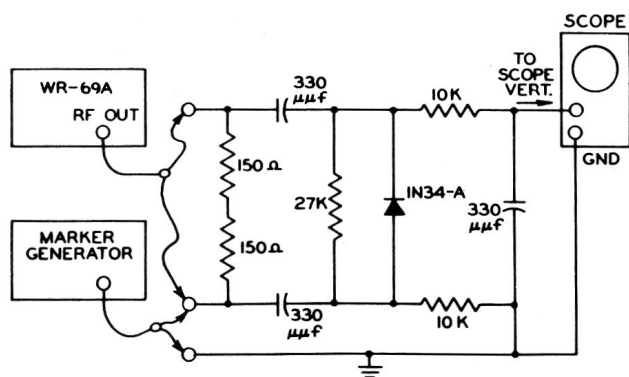


Figure 14. Test setup for channel-frequency adjustments.

with an oscilloscope which has a direct coupled vertical amplifier to check the rf voltage.

Set up the WR-69A to deliver an rf-output signal on channel 6. Set the SWEEP WIDTH control fully counterclockwise and adjust the RF OUT ATTEN for approximately 0.1 volt output. Connect the oscilloscope through the demodulator probe to one lead of the output cable. Connect the ground clip of the probe to the ground lead of the output cable. Adjust the vertical-gain control on the oscilloscope and the RF OUT ATTEN control on the WR-69A to obtain a trace of the desired height. Connect the demodulator probe to the other output lead and observe the voltage amplitude. If voltage differences indicate an unbalance in the output, adjust capacitor C5 to obtain the best balance of output voltage.

VFO Frequency Adjustment

Adjustment of the VFO requires use of an oscilloscope, a demodulator probe, and a marker calibrator, such as the RCA WR-89A. The correct test setup is shown in Figure 12. Tune the marker calibrator to deliver a signal at 117 Mc and set the IF/VIDEO control on the WR-69A for maximum capacitance. Set the CHANNEL control to "IF". When the IF/VIDEO ATTEN control is adjusted, two marker pips will appear on the oscilloscope trace. With an alignment tool, adjust coil L18 inside the shielded VFO compartment until the two markers coincide on the trace.

Tune the marker generator to 120 Mc and retune the IF/VIDEO control in a clockwise direction until the two markers again coincide on the trace. Loosen the nut holding the VFO assembly to the panel and reorient the assembly to bring the knob pointer as near as possible to "0" Mc on the panel. Retighten the nut.

IF/Video Amplifier Adjustment

The test setup for adjustment of the IF/Video Amplifier is the same as that shown in Figure 12 except that the marker generator is not required. With the demodulator probe connected to the IF/Video output lead, set the IF/VIDEO control to "50 Mc". With the SWEEP WIDTH control set fully clockwise, set the oscilloscope vertical-gain control to its most sensitive position and phase the sweep of the oscilloscope with the sweep of the WR-69A. With an insulated alignment tool, adjust peaking coil L20 for flattest response at the high-frequency end of the trace.

