Maintenance

A schematic diagram and a block diagram of the WR-70A are included in this instruction booklet to aid in troubleshooting. If trouble is encountered, voltage reading should be taken and compared with those shown on the schematic diagram. If it becomes necessary to replace any parts, only RCA replacement parts or their equivalents should be used. When ordering replacement parts for the WR-70A, consult the Replacement Parts List in this booklet.

The WR-70A may be removed from the case by removing two screws at the rear of the case, removing two screws from the bottom of the bezel, and working the bezel off the front of the case. The bezel, panel, and chassis should be removed as a single unit.

Principles of Operation

Reference to the section, "Function of Controls and Connectors" and to the block diagram in Figure 8 will be helpful in understanding the operation of the WR-70A.

Operation During RF Alignment:

When the WR-70A is used in an rf-test setup, such as that shown in Figure 5, operation is as follows. A sample voltage from the rf sweep generator is fed into the beat-frequency detector circuit, consisting of crystal diode CR1 and associated components, through the RF SWEEP SAMPLE IN connector. This rf sample voltage must be taken out of the rf-sweep generator ahead of the attenuator circuit to insure a constant voltage level at the input to the WR-70A, regardless of the setting of the generator attenuator. A sample-voltage output terminal is provided on late models of the RCA WR-59C and on modified WR-59-series TV Sweep Generators. The rf marker signal, at the desired marker frequency, is taken directly from the rf-output connector or output-attenuator of the marker generator and fed into the MARKER IN terminal. The sweep and marker signals are mixed in the CR1-detector circuit and a beat-frequency (difference) signal is obtained. The beat-frequency differences between the sweep and marker signals will vary from zero to the maximum swing of the sweep excursion. Only a limited band of beat frequencies are selected to form the marker signal. The beat signal is applied to stages V1A and V1B, which amplify the signal. The output from V1B is then applied to the mixer stage, V2, through the MARKER AMPLITURE control, R21, which adjusts marker height. Marker shape and polarity, are determined by L1, C3, and C4, which comprise a low-pass filter, and by CR2, which provides clipping. Switch S4 provides a choice of the markers. In the first three positions of S4, L1 is shorted out and C3 and C4 are disconnected from ground. In the fourth position, the beat signal is passed through the low-pass filter which filters out high-frequency components of the signal, resulting in a narrow marker on the 'scope trace. CR2 is disconnected in switch positions 2 and 4 and no clipping occurs. In position 1, the crystal clips the lower half of the marker; in position 3, polarity of the crystal connections is reversed and the top half of the marker is clipped.

The purpose of the operation just described is to provide a marker of the desired shape which can be applied to the sweep-response trace *after* the trace is taken

from the receiver. This method of superimposing the marker on the sweep trace eliminates trace distortion due to overloading of the receiver by the marker voltage and prevents obscuring the notches and other minute details in the trace by a wide-base marker. In addition, trap circuits in the receiver cannot "suck out" the marker.

The demodulated sweep trace is taken from the receiver at a demodulated-signal point in the tuner, at the second detector, or at high-frequency test points through a demodulator probe. The demodulated signal is fed to V3A through the DEMOD SIGNAL IN connector. V3A provides a small degree of amplification of the sweep signal and, in conjunction with TRACE AMPLITUDE & POLARITY control, R28, provides a means of adjusting polarity and amplitude of the trace displayed on the oscilloscope screen. The sweep signal is coupled from V3A to the adder stage, V2, where the marker pip is superimposed on the sweep trace. The output signal from the adder stage is available at the SCOPE VERT connector for application to the vertical-amplifier section of the oscilloscope.

An exceptional degree of freedom from "bounce", "jitter", and other undesirable scope-trace effects is provided by a unique voltage-stabilizing circuit consisting of V3B and associated resistors and capacitors. The component values are chosen to provide a long time constant. Any variation, such as a line-voltage surge, in the output voltage from the power supply, is applied to the grid of V3B. An out-of-phase signal at the plate causes cancellation of the surge voltage and a high degree of trace stability is obtained.

Operation During IF/Video Alignment:

The advantages of the WR-70A and the method of generating the marker signal, described under "Operation During RF Alignment", are the same for if/vf alignment except that the if/vf signal from the sweep generator is handled differently.

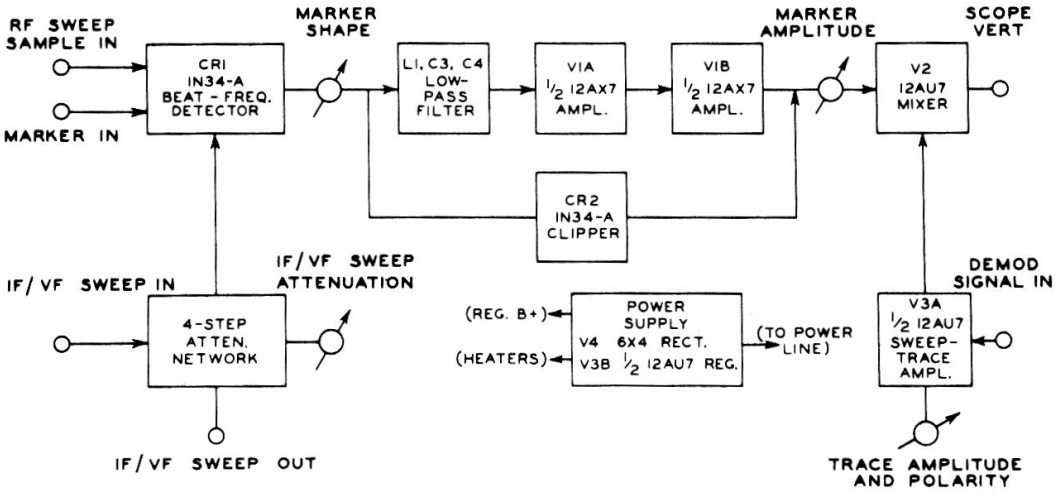

Figure 8. Block diagram of WR-70A

For generation of an if/vf marker, it is necessary, as in the case of an rf marker, to apply the full if/vf-sweep signal to the beat-frequency detector circuit. Because most if/vf-sweep generators are not equipped with a sample-voltage terminal located ahead of the if/vf attenuator, it is necessary to utilize the full if/vf-output voltage from the sweep generator for the WR-70A and to provide an additional means of attenuation before the sweep signal is applied to the receiver undergoing alignment. These requirements are met by feeding the maximum if/vf signal from the sweep generator directly into the WR-70A through the IF/VF SWEEP IN connector. The sweep voltage is fed to the beat-frequency detector circuit through resistor R3. The sweep signal is taken out of the WR-70A through the if/vf-attenuator section, which provides for attenuation of the signal over a range of 60 db. The output sweep voltage is available at the IF/VF SWEEP OUT connector for application to the receiver. The demodulated sweep signal from the receiver is fed into the DEMOD SIGNAL IN terminal, as previously described.

Type WR-70A

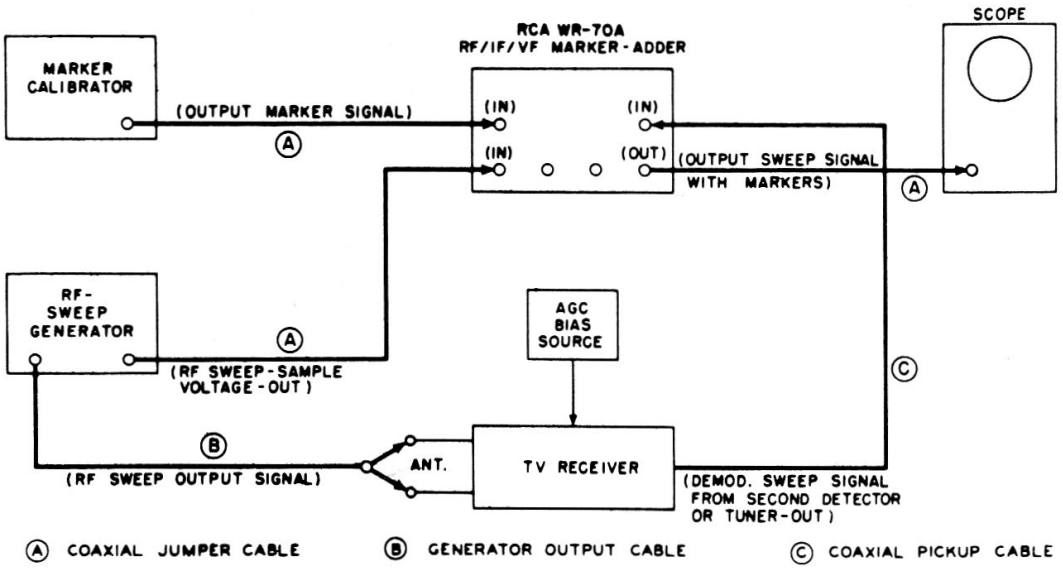

Figure 5. Test setup for R.F. alignment

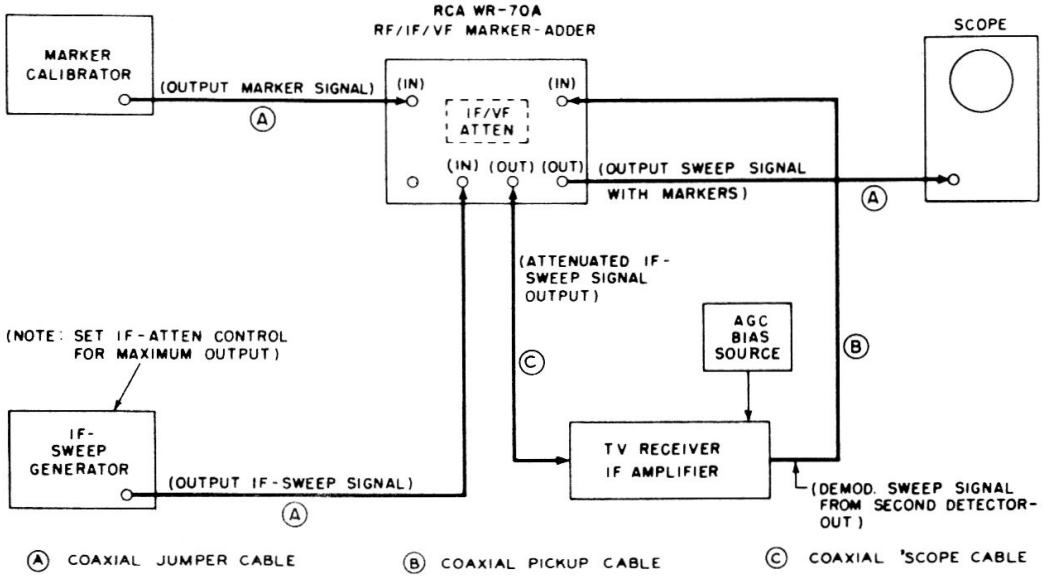

Figure 6. Test setup for I.F. alignment

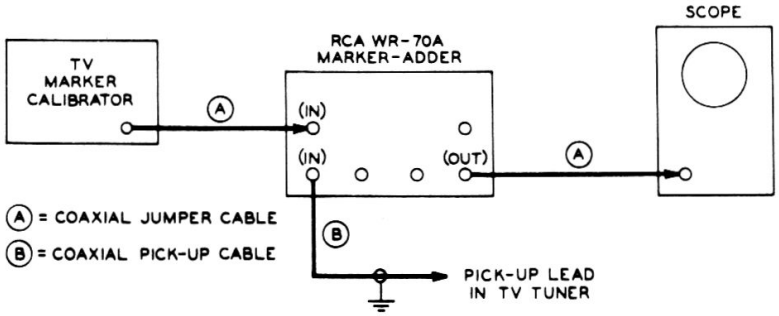

Figure 7. Test setup for checking tuner oscillator frequency of a TV receiver against calibrated marker generator