

Maintenance

General

The WR-59C is manufactured and tested in accordance with high engineering standards. Since the instrument has been properly aligned and adjusted at the factory, no further servicing is normally required. However, after long continued use, the Sweep Generator may require tube replacement or other servicing.

The performance of the WR-59C, like that of any other precision instrument, is dependent upon the rating and quality of its components. If it should become necessary to replace a component part, the stock number can be found in the Replacement Parts List in this book. Only RCA replacement parts, or parts having equivalent specifications, should be used.

Fuse

A small 1-ampere cartridge fuse (F1, Figure 12) protects the power-supply system; it should not be short-circuited or replaced with one of higher rating. The fuse is accessible when the rear panel of the instrument is removed.

Fuse failures should be carefully investigated before replacement since a fuse of good quality fails only under conditions of overload. The fuse clips should be kept clean and in secure contact with the fuse at all times.

Tube Replacement and Tube-Socket Voltages

When the instrument is removed from the case, all tubes except the rf oscillator tube (6J6) are readily available for checking or replacement. The 6J6 may be reached by removing the snap-on cover of the rf oscillator shield.

The normal voltages appearing at the tube-socket terminals with respect to chassis ground are shown in the schematic diagram. These values are indicative of the proper operating conditions of the circuit and should not vary in excess of $\pm 20\%$. Circuit defects ordinarily will be found in cases of greater variation.

An RCA VoltOhmyst was used to measure the voltages indicated in the schematic diagram. Checks should be made with this instrument or a unit having similar characteristics.

Phase Adjustments

At each setting of the CHANNEL selector, the output of the WR-59C sweeps over a band of frequencies. When this output is applied to an oscilloscope through a detector circuit, as in Figure 13, the band of frequencies appears as a straight line, each frequency within the band located at successive points along the line. The lowest frequency within each band should be situated at one extreme end of the straight line, the subsequent frequencies located progressively along the line, and the highest frequency at the other end of the line.

Unless the proper phase relationship exists among the modulating voltage, the blanking voltage, and the horizontal-deflection voltage for an oscilloscope, the band frequencies will not appear in proper sequence on the oscilloscope screen.

To adjust the phase of these three voltages, proceed in the following manner:

1. Set the CHANNEL selector to any channel between "2" and "6".
2. Connect the rf output of the WR-59C to the input of a detector, and the output of the detector to the vertical-deflection terminals of an oscilloscope, as illustrated in Figure 13.
3. Connect the SCOPE and GROUND terminals of the WR-59C to the horizontal-input terminals of the oscilloscope (Figure 13), and set the oscilloscope for external horizontal input.
4. Set the BLANKING switch to "OFF".
5. Turn the SWEEP WIDTH control fully clockwise. A horizontal line will appear on the oscilloscope screen.
6. Connect the WR-39C Television Calibrator, or equivalent marker generator, as illustrated in Figure 13, and tune the calibrator to the center frequency of the channel to which the WR-59C is set. One of two markers should appear on the horizontal line.
7. If two markers appear, adjust the PHASE control until the two markers are superimposed, as in Figure 14A.
8. Vary the output frequency of the Television Calibrator

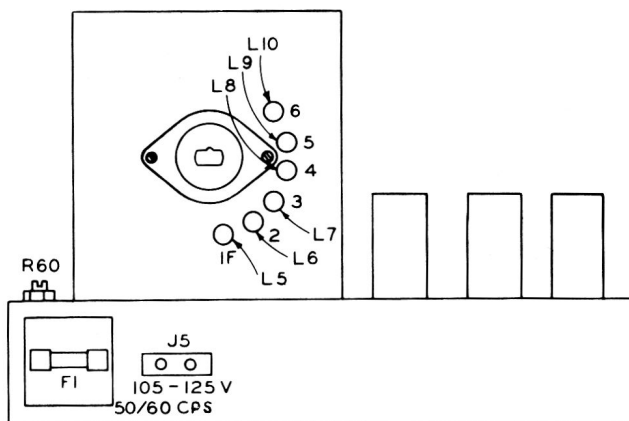


Figure 12. Rear View of WR-59C Chassis

until the marker moves to one end of the trace (Figure 14B).

9. Turn the BLANKING control to "ON". Both the rectified WR-59C output and the zero-reference line should be viewed on the oscilloscope screen, with the blanking action occurring at the end of the rectified-rf trace (Figure 14C).
10. If the blanking action does not occur at the end of the rectified-rf trace, adjust the blanking phase control R60 (Figure 15) until the output appears as illustrated in Figure 14C on the oscilloscope screen.

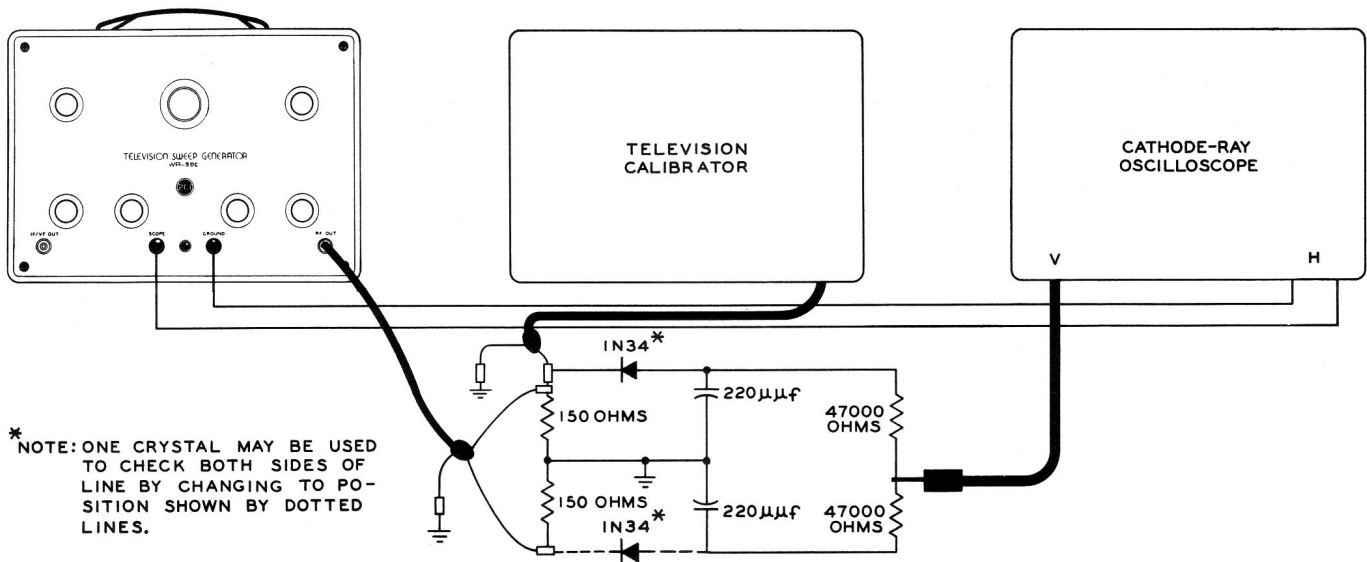


Figure 13. Setup for RF Alignment of the WR-59C

RF Alignment

Before attempting rf alignment, the reader should make any phase adjustments which may be necessary, proceeding as outlined above under "Phase Adjustments"

The following procedure for the rf alignment of the Sweep Generator is suggested:

1. Connect the Sweep Generator, a television calibrator, an oscilloscope and a detector circuit as illustrated in Figure 13.
2. Set the CHANNEL selector to channel 10, and tune the television calibrator to 195 Mc.
3. Back the capacitor plates C10A and C11A (Figure 15) all the way out. C10A and C11A are the two small screws near the stator-plate lips of the modulation capacitor.
4. Set the SWEEP WIDTH control for maximum sweep.
5. Turn in C10A and C11A by equal amounts until the marker appears in the center of the trace.
6. Set the SWEEP WIDTH control to minimum, and readjust C10A and C11A by equal amounts until the marker is again in the middle of the trace. CAUTION: Do not turn

C10A or C11A down tightly against C10 or C11 since this may short-circuit the "B" supply.

7. Set the CHANNEL selector to channel 2, and tune the television calibrator to the center frequency of this channel (lowest channel frequency + 3 Mc). NOTE: The iron-core tuning slugs of coils L6, L7, L8, L9, and L10, associated with channels 2 through 6, respectively, are accessible at the rear of the oscillator compartment. (See Figure 12.) Adjustments can be made when the rear panel of the case is removed.
8. With BLANKING switch at "OFF" position, adjust L6 (channel 2 tuning slug) until the marker is in the middle of the screen.
9. Reduce the width of the sweep, by means of the SWEEP WIDTH control, until the marker is situated at one end of the trace.
10. Readjust L6 to return the marker to the middle of the trace.
11. Repeat steps 9 and 10 until the marker is at the center of the trace with the SWEEP WIDTH control set for minimum sweep width.
12. Repeat steps 7 through 11 for channels 3 to 6, inclusive, adjusting the tuning coil associated with each channel

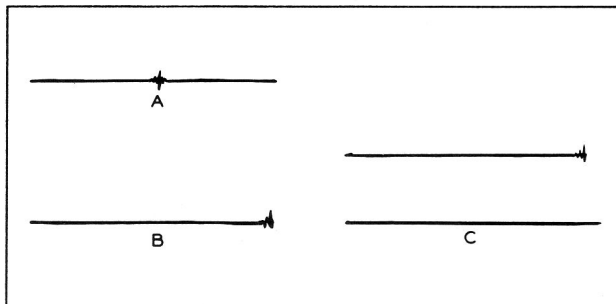


Figure 14. Phase Adjustment Traces

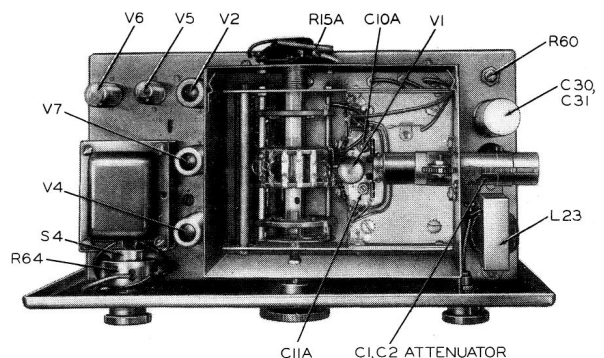


Figure 15. Top View of WR-59C Chassis

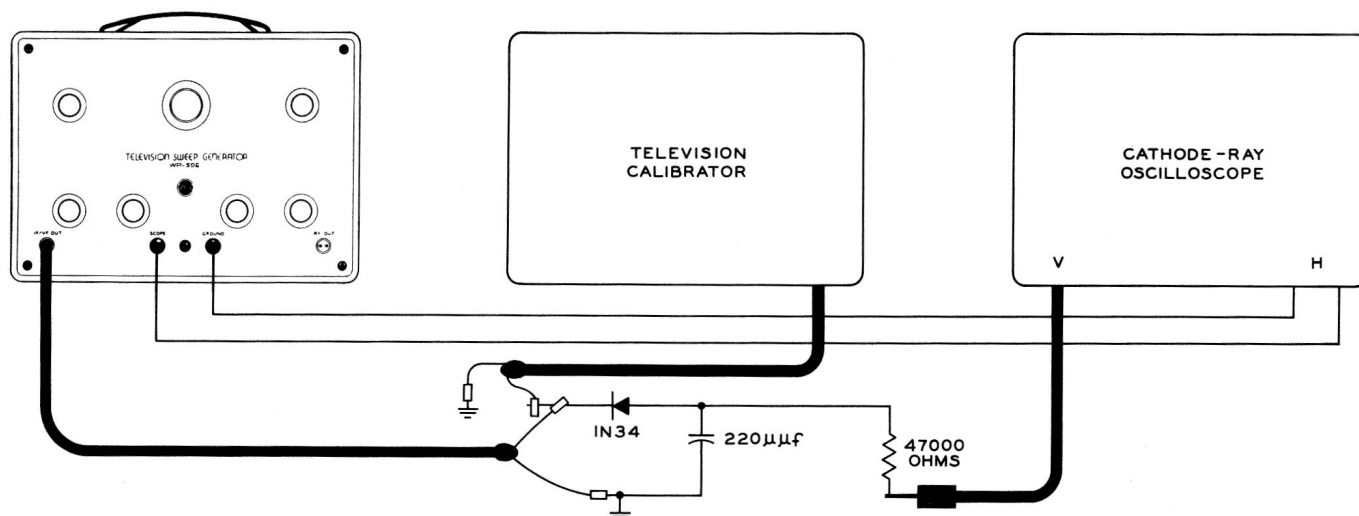


Figure 16. Setup for IF/VF Alignment of the WR-59C

under alignment. (See Figure 12 for physical location of coils.)

13. The small coils associated with channels 7, 8, 9, 11, and 12, and the coil arch associated with channel 13 are located on the CHANNEL selector. Channels 7, 8, 9, 11, and 12 can be aligned by opening or closing their respective coils; channel 13 can be aligned by flattening or opening its coil arch. The general procedure to be followed is the same as that outlined above for channels 2 through 6.

IF/VF Alignment

Before attempting if/vf alignment, the reader should make any phase adjustments which may be necessary, proceeding as outlined above under "Phase Adjustments".

The following procedure for the if/vf alignment of the Sweep Generator is suggested:

1. Set the CHANNEL selector to position "IF".
2. Using the setup illustrated in Figure 13, adjust L5 (Figure 12) until the rf sweep oscillator sweeps from 99 to 109 Mc, approximately, with the SWEEP WIDTH control in its maximum position.

3. Remove the RF Output Cable.

4. Rearrange the setup as illustrated in Figure 16. Note that the two 150-ohm resistors across the input to the detector have been removed and the IF/VF Output Cable is used in this setup.

5. Tune the television calibrator to 50 Mc.

6. Readjust L5 so that the unused portion of the curve beyond zero beat is approximately equal to the portion of the curve above the 50-Mc "pip", as illustrated in Figure 17. The curve in Figure 17 will not appear in its entirety on the screen of the cathode-ray oscilloscope. However, by rotating the IF/VIDEO control over its entire range of frequencies, the reader can view the curve a portion at a time.

7. With the BLANKING switch at "OFF" position, adjust the PHASE control for a single pattern of the response curve on the oscilloscope screen. Turn the BLANKING switch to "ON" position.

8. Adjust inductance L19 to produce the flattest possible response over the entire frequency range of the IF/VIDEO control. For those instruments which utilize the circuit shown in Figure 6, page 10, adjust inductances L19 and L20 to produce the flattest response over the entire frequency range of the IF/VIDEO control.

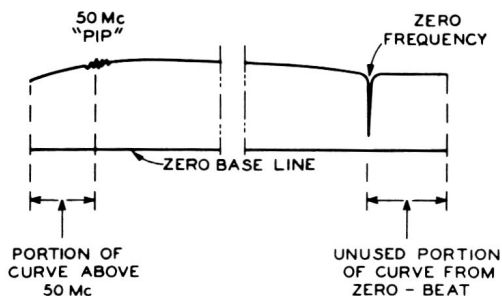


Figure 17. IF/VF Response of the WR-59C