



RCA

WR-50B

RF SIGNAL GENERATOR

Maintenance

The RCA WR-50B Signal Generator employs two electron tubes and one selenium rectifier diode in circuits of conventional design. The rf oscillator utilizes one triode section of a 12AT7 in a Hartley oscillator circuit. The rf output is coupled to the second triode section, which serves as a cathode follower. One-half of a 12AT7 is used as a transformer coupled audio oscillator, and the other half as a Pierce-type crystal oscillator circuit.

Variable capacitance diode, CR-3, is used in conjunction with the 455 kc and 10.7 Mc tuned circuits to sweep the VFO oscillator. AC voltage is applied to CR-3 from the heater circuit to provide a 60 cps sweep rate. Tube section V-2B and diode CR-2 are used in a retrace blanking circuit.

The generator can be taken out of the case by removing the two #6 screws on the rear of the case, and the four #4 screws from the panel.

Indicator Adjustment

The clear plastic tuning indicator on the WR-50B can be adjusted by removing the instrument from the case, and loosening the set screws on the indicator shaft. Turn the tuning capacitor to fully meshed position. Set the indicator so that the F index line is aligned with the short reference mark between the upper and lower panel scales. Tighten the two set screws on the shaft of the indicator.

Frequency Alignment

The generator has six internal trimmer capacitors and eight inductance adjustments as shown in Figure 33. These internal adjustments are located on S-1, the Range Switch.

VFO Alignment Procedure

Equipment required:

General-coverage communications receiver, capable of tuning the range from 540 Kc to 36 Mc.

Crystal, 100 Kc.
Crystal, 1.0 Mc.
Crystal, 10.0 Mc.

In this alignment procedure, the receiver is tuned to a specified frequency or harmonic from the crystal oscillator in the WR-50B. The variable oscillator is then tuned to this frequency, and the internal adjustments of the instrument are set so that a zero-beat signal is heard from the receiver.

The complete alignment procedure is given in tabulated form in Figure 35. The following steps provide a more detailed description of this procedure.

1. Remove the snap-in plug from the rear of the case. Apply power and allow the instrument to warm up for at least 15 minutes.

2. Connect the equipment as shown in Figure 34. Plug the 100 Kc crystal into the WR-50B socket. Turn the % MOD switch fully counterclockwise, and the VFO ON/OFF switch to "OFF".

3. Tune the receiver to 900 Kc, and locate the exact point on the receiver dial where the effect of the unmodulated crystal oscillator harmonic frequency is noted ($100 \text{ Kc} \times 9$). Set the HI/LO switch and the RF ATTEN control so that the output is attenuated as much as possible, yet the effect of the crystal oscillator signal can still be heard.

NOTE: The unmodulated crystal oscillator signal can be identified by a "deadening" of the receiver background noise. If the receiver is equipped with an "S" meter, the meter will indicate a rise at the crystal-oscillator frequency (or harmonic). As a check to be sure that it is the unmodulated crystal frequency being heard, remove the crystal from the WR-50B. The crystal oscillator signal will disappear when this is done.

4. Set the WR-50B Range Switch to position "A", and tune the indicator to 90 Kc on band A (the 10th harmonic of 90 Kc is 900 Kc). Set the VFO ON/OFF switch to "ON".

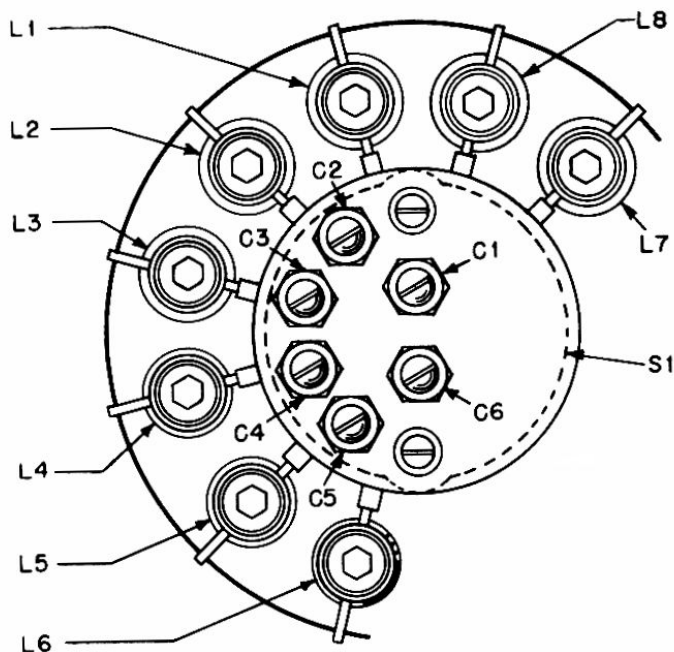


Figure 33. Location of coil adjustments L1—L8 and capacitor adjustments C1—C6

Adjust the coil, L-1, so that the zero-beat signal is heard.

5. Retune the receiver to 1000 Kc. Set the WR-50B VFO ON/OFF switch to "OFF", and locate the exact point on the receiver dial where the 1000 Kc harmonic of the 100 Kc crystal oscillator frequency is heard ($100 \text{ Kc} \times 10$). If necessary, adjust the RF HI/LO switch and the RF ATTEN control for minimum usable signal.

6. Tune the WR-50B to 200 Kc on band A (the 5th harmonic of 200 Kc is 1000 Kc). Set the VFO ON/OFF switch to "ON". Adjust the trimmer capacitor, C-1, so that the zero-beat signal is heard.

7. As a check, repeat steps 3 through 6.

8. In a similar manner, align the remaining five frequency ranges as indicated in the tabulation in Figure 35.

Tube Replacement — If it becomes necessary to replace V-1, 12AT7, realignment of the instrument as described above may be required.

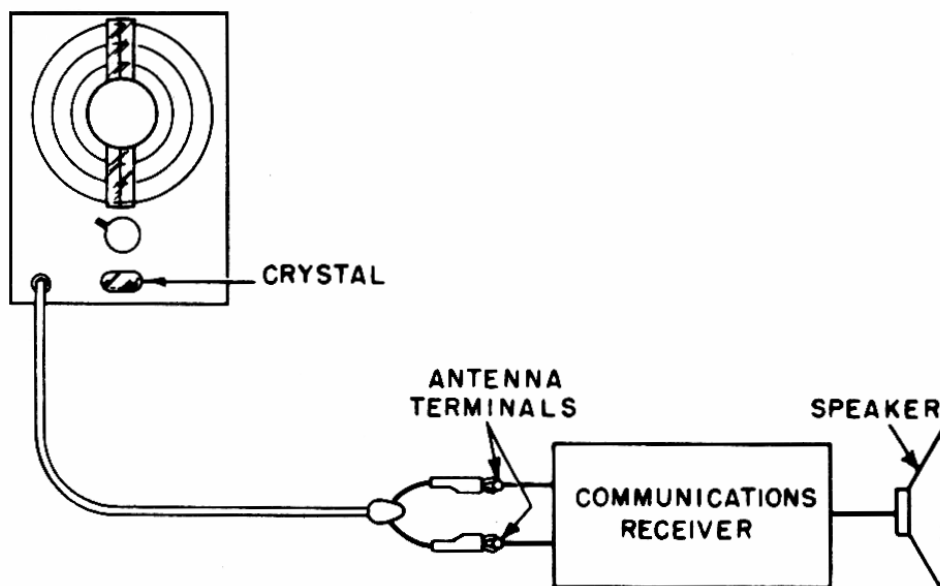


Figure 34. Recommended test setup for alignment of WR-50B

WR-50B Frequency Alignment Procedure

WR-50B Range	WR-50B Dial	XTAL	Receiver Dial	WR-50B Adj.
A (low frequency end)	90 Kc	100 Kc	900 Kc	L-1
(high frequency end)	200 Kc	100 Kc	1000 Kc	C-1
B (low frequency end)	225 Kc	100 Kc	900 Kc	L-2
(high frequency end)	550 Kc	100 Kc	1100 Kc	C-2
C (low frequency end)	600 Kc	100 Kc	600 Kc	L-3
(high frequency end)	1600 Kc	100 Kc	1600 Kc	C-3
D (low frequency end)	1600 Kc	100 Kc	1600 Kc	L-4
(high frequency end)	4000 Kc	1.0 Mc	4000 Kc	C-4
E (low frequency end)	5.0 Mc	1.0 Mc	5.0 Mc	L-5
(high frequency end)	14.0 Mc	1.0 Mc	14.0 Mc	C-5
F (low frequency end)	14.0 Mc	1.0 Mc	14.0 Mc	L-6
(high frequency end)	40.0 Mc	10.0 Mc	40 Mc	C-6

Figure 35. Alignment procedure

Sweep Circuit Alignment

Equipment required:

VTVM, RCA VoltOhmyst or equiv.
Oscilloscope, RCA WO-33A, WO-91A, B or equiv.

Detector Probe for oscilloscope,
RCA WG-302A, WG-350A, or equiv.

Crystals — 455 Kc
 10.7 Mc

1. Remove the instrument from the case. Apply power and allow a warm-up time of several minutes. Set the controls as follows:

MOD EXT
VFO ON
RF HI
XTAL OSC HI
RF ATTEN. .full clockwise
Range Switch
 455 KC SWEEP

2. Connect VTVM dc probe to center lug of R-9, located in the approximate center of the chassis. Connect

ground lead from the VTVM to the chassis. Adjust R-9 so that VTVM indicates 6 volts dc. Remove VTVM leads.

3. Connect detector probe from oscilloscope to the rf output probe of WR-50B. Adjust oscilloscope sweep selector to 60 cps line sweep, and the range switch to maximum sensitivity. Insert 455 Kc crystal in crystal socket. Adjust phase control of oscilloscope so that patterns overlap.

4. Set MOD switch to "SWEEP". Adjust core of coil L-7 so that 455 kc marker appears in the center of the trace, as shown in Figure 36. The marker will be quite broad, as shown. Reduce marker size by setting XTAL OSC switch to "LO".

5. Remove 455 kc crystal from crystal socket, and insert 10.7 Mc crystal. Set the Range Switch to "10.7 MC SWEEP". Adjust core of coil L-8 so that 10.7 Mc marker is in center of trace, as shown in Figure 37.*

**If instrument is badly misaligned, adjust core fully counterclockwise, then clockwise until marker appears.*

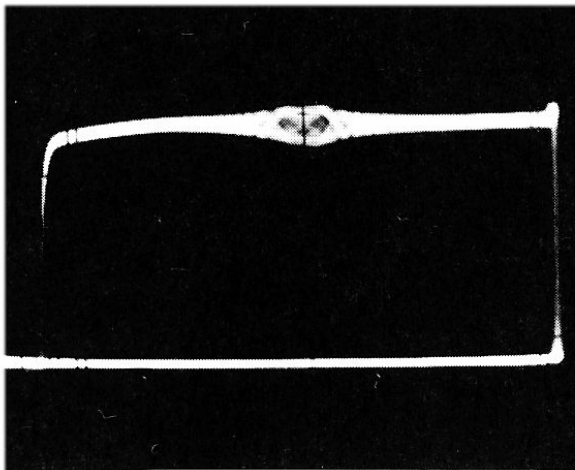


Figure 36. 455 kc Sweep Trace

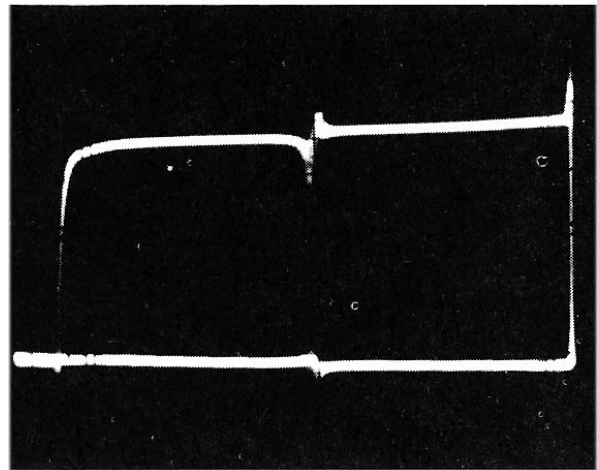


Figure 37. 10.7 Mc Sweep Trace