cover which is closer to the front of the chassis. Adjust this 2nd stage neutralizing trimmer by turning it clockwise until the VTVM swings up scale (indicating oscillation). At this point, SLOWLY turn the trimmer counterclockwise one half turn past the point where the oscillation stops. This must be done with an insulated screwdriver (the type with a very small steel piece in the end of a plastic rod).

8. Insert V1 - 6CW4, 1st RF amplifier. Adjust C5 (the 1st RF stage neutralizing capacitor located through the side hole on the right side of the bottom cover, closest to the front of the chassis) using the same procedure as in step 7.
9. Feed in a signal to J1 at about 50.5, 146 or 221.5 Mc., depending on your model, and tune L2, 3, 4, 5 on the 50 Mc. unit (or C1, C4, C10, C15, C21 on the 144 or 220 Mc. units) for maximum. Keep the output below 3 volts by reducing the signal input as you proceed through the alignment steps. If voltage will not go down, repeat steps 7 and 8.
10. Disconnect R2 at point A, increase the signal strength enough to move the meter 1/4 to 1/2 volt and readjust C5 for MINIMUM meter reading.
11. Reconnect R2 to point A but do not solder.
12. Disconnect R5 from point B and repeat step 10, adjusting C13 or C16 instead.
13. Reconnect R5 to point B but DO NOT solder.

MODEL CN-50 ONLY

14a. Tune the signal source to 51 Mc. and adjust L4 and L5 for maximum output on the VTVM.
14b. Tune the signal source to 50 Mc. and adjust L2 and L3 for maximum output on the VTVM.
14c. Tune the signal source to 49.5 Mc. and adjust L1 bottom core for maximum output (this tunes broadly).
14d. Tune the signal source to 50.5 Mc. and adjust L1 top core for maximum output (this tunes broadly).

NOTES: If there is any pronounced peak when tuning across the band, L2 can be adjusted slightly to smooth the response. It seldom requires more than one turn.

Bandwidth is controlled by the position of the "figure 8" links on L2 and L5. Typical adjustment is with the link at the end of the winding on L2 but not covering any turns. The other end of the link should be around the winding of L3. The other link should be around the winding of L4 and near the end of L5, covering 2 or 3 turns. Bandwidth is increased by moving the links to cover more of the windings on L2 and L5, decreased by bending the links away from the windings. Mid-band gain is little affected by these adjustments.

MODEL CN-144 ONLY

14a. Tune the signal source to 148.0 Mc. and adjust C4 and C21 for maximum output on the VTVM.
14b. Tune the signal source to 150 Mc. and adjust C10 for maximum output. If 150Mc. is not available, tune at 148 Mc. and turn C10 two turns counter-clockwise from the peak reading.
14c. Tune the signal source to 144 Mc. and adjust C1 and C15 for maximum output. Then turn C1 - 2 turns CW.

NOTE: If there is any pronounced peak in noise when tuning across the band, C4 can be adjusted slightly to smooth the response on CN-144, C10 on CN-220. It seldom requires more than one turn.

MODEL CN-220 ONLY

To align the CN-220, the bottom cover must be removed.
A loading unit consisting of a .001 mfd. ceramic capacitor in series with a 1000 ohm carbon resistor will be required. The leads must be very short. To use the loading unit, connect it across the coil or from the hot side of the coil to the chassis. If it is fastened to a plastic rod, is will be most convenient to use.
14a. Tune the signal source to 220 Mc. and adjust C1 for maximum output, then detune one turn clockwise.
14b. Tune the signal source to 222.5 Mc. and adjust C4 for maximum output with load across L3.
14c. Tune the signal source to 222.5 Mc. and adjust C10 for maximum output with load across L2.
14d. Tune the signal source to 222.5 Mc. and adjust C15 for maximum output with load across L5.
14e Do not adjust C21.

ALL MODELS

15 Step 14 for all models should be repeated at least once as there is interaction between the various adjustments.
16. Insert the crystal and tune the receiver to the center of the band of interest - 51 Mc., 146 Mc., 222.5 Mc.
17. In this step, do not attempt to use the "S" meter on your receiver. Turn off the AVC circuit or keep the signal level so low that the slightest change in noise level from the speaker will be quite noticeable. Carefully adjust L6 for maximum audio output. Typical settings are as follows: 7-11 Mc., the slug near the top of the can. 14-18 Mc., the slug near the center of the can. 28-30 Mc., the slug near the bottom of the can. There will be no changes in voltage at test point TP during this step.
18. To check for stability, reduce the signal input from the generator and rotate the gain control from full clockwise to full counterclockwise several times while watching the VTVM. The voltage at point TP should not vary very much. If the meter jumps up or down the scale, the neutralization adjustments must be repeated (steps 10, 11, 12 and 13).
19. Disconnect the signal generator and repeat the checks in step 18.
20. Connect the antenna and repeat the checks in step 18.
21. If it all checks OK, solder points A and B.

Note that if, at a later date, or with change of antenna, the RF amplifier oscillates, a quarter turn on C5, or occasionally C13 or C16 will stop the oscillation. It is not necessary to go through the original procedure. Normally no adjustment is required when tubes are replaced.

22. Repeat steps 4 and 5 to adjust the oscillator injection level.

NOTE: The above procedures will give satisfactory results with the commonly available test equipment usually found in an amateur station. If you have a good sweep generator, marker generator and oscilloscope, somewhat more even gain can be produced, usually within ± 1.5 db.