

TRADE NAME	Collins Model 51J-3		
MANUFACTURER	Collins Radio Co., Cedar Rapids, Iowa		
TYPE SET	AC Operated Multi-Bnad AM Superheterodyne Communication Receiver		
TUBES	Eighteen		
POWER SUPPLY	110-120, 220-240 Volts 45 to 75 Cycles	RATING	.82 Amp. at 117 Volts AC
TUNING RANGE	500KC - 30.5MC		

ALIGNMENT INSTRUCTIONS

ADJUSTMENT INSTRUCTIONS - READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Alignment of this equipment should be attempted only by authorized and competent service personnel with proper test facilities. Allow a 15 minutes warm-up period for receiver and test equipment. The following test equipment and alignment tools should be used:

- 500KC to 30.5MC signal generator
- DC vacuum tube voltmeter and oscilloscope
- Two fiber or bakelite aligning tools having diameters of 1/8" and 5/16" and using screwdrivers type bits.

(Preset CAL coarse frequency trimmer at mid-capacity front panel screwdriver adjustment location to left of zero ADJ knob.)
Use a secondary frequency standard and adjust A1 to calibrate the 100KC crystal oscillator.

Set AVC to "on" position and calibrate to "off" position.
Note: The calibration oscillator may be used if a signal generator is not available. Set calibrate to "on" position and follow procedure outlined below. Using the "Kilocycle Knob" tune receiver to each alignment frequency until a peak reading is obtained on the input meter. Make the indicate adjustments but use the "input meter" on panel to indicate maximum readings.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1. 2MMF	High side to pin 1 (grid) of 6AK5 (v1). Low side to chassis.	29.5MC (Unmod)	30	29.5MC	DC probe thru 470K to pin 7 (grid 3) of 6BE6 (V2). Common to chassis.	A3	Preset A2 to MINIMUM capacitance. Adjust for maximum deflection if less than 2 volts is obtained at VTVM. If more than 2 volts deflection is obtained re-adjust (detune toward MINIMUM capacitance) until 2 volts deflection is obtained.
2. *	**	27.5MC	**	27.5MC	**	A4	**
3. **	**	25.5MC	**	25.5MC	**	A5	**
4. **	**	23.5MC	**	23.5MC	**	A6	**
5. **	**	21.5MC	**	21.5MC	**	A7	**
6. **	**	19.5MC	**	19.5MC	**	A8	**
7. **	**	17.5MC	**	17.5MC	**	A9	**
8. **	**	15.5MC	**	15.5MC	**	A10	**
9. **	**	13.5MC	**	13.5MC	**	A11	**
10. **	**	1.5MC	*	1.5MC	**	A12	**
11. *	*	*	*	**	DC probe thru 470K to pin 1 (grid 1) of 6BE6 (V2). Common to chassis.	A13	

FIXED 500KC IF AMPLIFIER ALIGNMENT

Connect the generator to pin 7 (grid 3) of V5. Connect a clip lead to the cold side of C92 (output of crystal oscillator). Hold other end of clip lead near grid of V5. Set calibrate to "On" position and zero beat signal generator at 500KC. Set calibrate to "Off" position. Set selectivity to "0" position. Attenuate generator output to maintain not more than 3 volts of VTVM.
In step 19 the VFO pitch oscillator is aligned using a signal generator. An alternate method of alignment without a signal generator is as follows:

- Disconnect antenna. Turn calibrate and BFO to "On" positions.
- Tune to a 100KC check point on hands 2 or 3. For example: Tune receiver to 2.0MC.
- If the "BFO Pitch" knob has never been removed from the shaft, rotate the knob until the line on the knob lines up with the line on the panel. If the knob has ever removed from the shaft adjust A21 to produce a beat note. Turn BFO pitch knob to right or left of the panel mark until the beat note reaches maximum pitch. The BFO pitch capacitor plates are now either fully closed or open. Loosen set screws on BFO pitch knob and turn knob until white line on knob is 90 degrees from panel mark. Tighten set screws and align mark on knob with mark on panel. The BFO pitch is now at mid-range.
- Tune receiver 10KC off of any 0.1KC point on bands 2 or 3 and advance AUDIO GAIN until a constant pitch beat note is heard. If the constant pitch beat note is not available, adjust A21 until it is. To make sure that this is the correct note turn the kilocycle dial ± 10 KC and note whether the pitch of the note remains constant. This constant pitch beat note (on bands 2 and 3 only) is the result of fifth harmonic from 100KC oscillator that leaks into the IF strip and beats with the signal from the BFO. Due to the greater strength of the calibration beat note near a 100KC check point, this constant pitch beat note is most audible about mid-way between check points.
- Adjust A21 for zero beat. The BFO frequency is now 500KC when the mark on the BFO pitch knob coincides with the mark on the panel.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
12. .01MFD	High side to pin 7 (grid 3) of 6BE6 (V5). Low side to chassis.	500KC	Any non interfering position	Any	DC probe to point <A>. Common to chassis.	A14	Connect detuning net of .01MFD in series with 4700 Ω to pin 5 (plate) of V8 and chassis. Adjust for maximum deflection.
13. **	**	**	**	**	**	A15	Reconnect detuning net to pin 1 (grid) of V9. Adjust for maximum deflection.
14. **	**	**	**	**	**	A16	Reconnect detuning net to pin 5 (grid) of V9. Adjust for maximum deflection.
15. **	**	**	**	**	**	A17	Reconnect detuning net to terminal #4 of L27. Adjust for maximum deflection.
16. **	**	**	**	**	**	A18	Reconnect detuning net to pin 5 (grid) of V10. Adjust for maximum deflection.
17. **	**	**	**	**	**	A19	Reconnect detuning net to pin 5 (grid) of V28. Adjust for maximum deflection.
18. **	**	**	**	**	**	A20	Adjust for maximum deflection.

19. If the BFO pitch knob has never been removed from the shaft, align the BFO as follows: Turn BFO to "On" position. Adjust A21 to produce a beat note. Set BFO pitch knob so that mark on knob coincided with mark on cabinet, then turn knob either to right or left of the panel mark until a point where maximum pitch is obtained. The BFO pitch capacitor are now either fully open or fully closed. Loosen set screws in BFO pitch knob and turn knob on shaft until mark on knob is 90 degrees from panel mark. Tighten set screws. Turn knob so that mark coincides with mark on panel. Adjust A21 for zero beat.

20. To align L25 use scope and FM signal generator having a sweep rate of 4 cycle per second, a frequency excursion of approximately 20KC and a Carrier frequency between 1.5 and 3.5MC.

Set the mark on the phasing control knob to coincide with mark on panel. Set the phasing capacitor to its mid-range as follows: Look into right hand hole in top of crystal filter cover (use flash light) in order to see phasing capacitor plates. Rotate phasing control until rotor plates completely mesh with the stator plates. Loosen set screws in phasing control knob and turn knob so that is 90 degrees to the left of the panel mark. Tighten set screws and rotate knob until marks coincide the phasing capacitor is now its mid-range position.
Switch Selectivity to position "1". Turn AVC, Limiter, BFO and Calibrate to "Off" positions.

21.	.01MFD	High side to pin 7 (grid 3) of 6BE6 (V5). Low side to chassis	2.5MC (20KC Swp)	2	See Remarks	Vert. Amp. To point . Low side to chassis	A22	Turn RF gain to mid-range and synchronise scope. If two symmetrical peaks (each peak is an IF response curve) do not appear on scope, adjust receiver tuning, RF gain and scope controls until they do. Turning phasing control to should left cause rejection notch to appear on one side of each peak. If notch dose not appear set phasing control approximately 1/8 turn to left of center and adjust A22 until a well defined notch appears on scope pattern. Adjust until no evidence of damped oscillation remains. Turn phasing control approximately 1/8 turn to the right of center. The rejection notch should be appear on opposite side of each peak. If the notch is not well defined with no evidence of damped oscillation SLIGHTLY retouch A22. Repeat step 21 until a symmetrical notch with no evidence of damped oscillation appears on both sides of the response curve as outlined above.
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500KC IF PERFORMANCE MEASUREMENTS

SENSITIVITY - An input signal of 25 to 40 microvolts at pin 7 (grid) of V5 should produce 4 volts on VTVM at point
SELECTIVITY -

- Alternate signal generator for 4 volts at point . Use voltage at point and output level of signal generator as reference voltage.
- Increase signal generator output 6DB (double the voltage). The band width may be determined by noting how far on either side of resonance the generator signal must be detune to lower the voltage at point to 4 volts.
- Repeat procedure in step 2 for 60DB increase (1000 times the signal input voltage level).
- The overall selectivity specifications are:
 - Minimum selectivity

6DB	5.5KC Min.	6.5KC Max.
60DB	17.0KC Min.	20.0KC Max.
 - Maximum selectivity (crystal filter in)

6DB	0.2KC Min.	0.3KC Max.
60DB	0.2KC Min.	12.0KC Max.

ALIGNMENT OF DIALS WITH VFO

- A. MEGACYCLE DIAL POINTER** - If the dial pointer has been accidentally slipping along the dial cord then rest pointer as follows: Remove the escutcheon plate; turn the kilocycle knob counter clockwise until it reaches the mechanical stop. Then turn it clockwise until the zero-zero mark lines up with the fiducial mark. Turn the kilocycle knob exactly 5 turns clockwise. Slide the megacycle pointer along the dial cord to the center frequency of the band. For example: 2.0MC is the exact center of band 2.
- B. KILOCYCLE DIAL** - If the kilocycle dial reading is incorrect it will be necessary to determine the magnitude and direction of the errors first. To do this, set receiver band 2. Set kilocycle fiducial line to the center mark on the escutcheon opening by rotating zero adjustment knob. Set mark on BFO pitch knob to coincide with mark on panel (this sets BFO at 500KC as outlined in step 19). Set calibrate to "On" position. Rotate kilocycle knob to zero beat. Note magnitude and direction of error in kilocycle dial reading. Tune receiver to 2.5mc. Leave BFO pitch knob set at 500KC and rotate kilocycle knob to point of zero beat. Again, note magnitude and the direction of error in the kilocycle dial reading.
- If kilocycle dial reading is incorrect by less than 3KC in the same direction by equal amount at both ends of the megacycle dial correct as follows:
 - Make certain BFO pitch knob is set at 500KC.
 - Tune the receiver for zero beat at the 100KC check point nearest the dial setting for which maximum accuracy is desired. For example: If maximum accuracy is desired at 1.83MC, tune for zero beat at 1.8MC by rotating the kilocycle knob.
 - Set kilocycle fiducial line to zero-zero on kilocycle dial by rotating zero adjustment knob.
 - If the kilocycle dial reading is incorrect by more than 3KC in the same direction by an equal amount at both ends of the megacycle dial, correct as follows:
 - Check to see that BFO pitch knob is set at 500KC.
 - Tune to zero beat at 1.5MC.
 - Set kilocycle fiducial line to middle index mark on escutcheon opening by rotating zero adjustment knob.
 - Loosen the set screws in circular kilocycle dial and set to zero-zero. Tighten set screws.
 - If the two errors in kilocycle dial reading are either opposite in direction or vary in size, it indicates that VFO end points have shifted. Correct as follows:
 - Check to see that BFO pitch knob is set at 500KC then tune receiver to zero beat at 1.5MC on band 2.
 - If the zero mark on kilocycle dial line within the lines on escutcheon opening, set kilocycle fiducial line to zero-zero on the kilocycle dial by rotating the zero adjustment knob.
 - If the zero-zero mark fails outside the lines on the escutcheon opening, loosen set screws in the kilocycle dial. Set fiducial mark to the center line in the escutcheon opening. Turn kilocycle dial until zero-zero mark coincides with the fiducial. Tighten set screws.
 - Turn kilocycle knob approximately 10 turns counter clockwise to zero beat. This procedure should tune the receiver to 2.5MC.
 - At this point note the error in the kilocycle dial reading.
 - If this error is less than ± 3 KC, set the fiducial to 2.5MC by rotating the zero adjustment knob. This establishes the point of maximum accuracy at 2.5MC. If maximum accuracy is desired at some other point in the band, the receiver may be tuned to zero beat at the desired check point. Then adjust fiducial to zero-zero on the kilocycle dial.
 - If the error is more than ± 3 KC refer to VFO alignment.
- C. VFO FREQUENCY CHECK** - The VFO frequency should be checked against a known source to determine if the VFO shaft has been displaced a full turn, thereby shifting the VFO frequency exactly 100KC. Use a signal generator having an accuracy of $\pm 1\%$ or ± 2 KC or another 51J-3 receiver known to be properly aligned, and check as follows:
- Set BFO pitch knob at 500KC and turn calibrate to "On" position.
 - If signal generator is used, connect high side to pin 7 (grid 3) of 6BE6 (V5). Low side to chassis. Set generator to 2.0MC. Tune receiver for zero beat at 2.0MC. If the BFO shaft is displaced a full turn, zero beat should occur within 20KC of 1.9MC or 2.1MC instead of 2.0MC.
 - If accuracy aligned 51J-3 test receiver is used couple the antenna jack of the receiver to the output of the VFO to be checked. Set BFO pitch of test receiver at 500KC. Switch calibrate to "On" position in test receiver. Tune the receiver containing VFO to be checked to 2.0MC. Tune test receiver to zero beat at 2.5MC. If the shaft of the BFO being checked is displaced a full turn, zero beat should occur at 2.4MC or 2.6MC instead of 2.5MC.
 - If step 2 or 3 indicate that the VFO shaft has been displaced a full turn, correct follows:
 - Connect a clip lead from pin 7 (grid 3) of 6BE6 (V5) to the cold side of C92 (100KC oscillator output). Turn calibrate to "On" position. Set BFO pitch at 500KC and tune receiver to zero beat at 2.5MC. Loosen set screws in VFO coupler.
 - If zero beat occurred at 2.1MC instead of at 2.0MC in step 2 or at 2.4MC instead of at 2.5MC in step 3 the VFO frequency is 100KC lower than it should be. Correction can be made by turning VFO shaft one full turn counter clockwise to zero beat.
 - If zero beat occurred at 1.9MC in step 2 or at 2.6MC in step 3 the VFO frequency is 100KC higher than it should be. Correction can be made by turning VFO shaft one full clockwise to zero beat.
 - Tighten set screws in VFO shaft coupler.

VARIABLE IF ALIGNMENT

• Alternate signal generator output to maintain less than 5 volt on VTVM at point <A>

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
22.	47U Resister in series with 100MMF capacitor	High side thru dummy to antenna receptacle. Low side to chassis.	1.6MC (Unmod)	2	1.6MC	DC probe to point <A>. Common to chassis.	A24,A25 A26	Set A23 (ant. Trim.) to its mid-range position. Turn BFO to "On" position and adjust generator to zero beat at 1.6MC. Turn BFO to "On" position. Adjust A24, A25 and A26 for maximum deflection.
23.	• •	• •	2.4MC	• •	2.4MC	• •	A27,A28 A29	Tune BFO to "On" position and adjust generator to zero beat at 2.4MC. Turn BFO to "On" position. Adjust A27, A28 and A29 for maximum deflection. Repeat step 22 and 23 until maximum deflection is obtained on VTVM.

ALIGNMENT INSTRUCTIONS • cont. •

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• Alternate signal generator output to maintain less than 5 volt on VTVM at point <A>

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
24. 47U Resister in series with 100MMF capacitor	High side thru dummy to antenna receptacle. Low side to chassis.	2.6MC	3	2.6MC	DC probe to point <A>. Common to chassis.	A30 A31 A32	Turn BFO to "On" position and adjust generator to zero beat at 2.6MC. Turn BFO to "Off" position. Adjust for maximum deflection.
25. • •	• •	2.4MC	• •	2.4MC	• •	A33 A34 A35	Turn BFO to "On" position and adjust generator to zero beat at 2.4MC. Turn BFO to "Off" position. Adjust for maximum deflection. Repeat steps 24 and 25 until maximum deflection is obtained on VTVM.

RF ALIGNMENT BANDS 4-7

• Alternate signal generator output to maintain less than 5 volt on VTVM at point <A>

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
26. 47U Resister in series with 100MMF capacitor	High side thru dummy to antenna receptacle. Low side to chassis.	4.0MC (Unmod)	4	4.0MC	DC probe to point <A>. Common to chassis.	A36 A37 A38	Turn BFO to "On" position and adjust generator to zero beat at 4.0MC. Turn BFO to "Off" position. Adjust for maximum deflection.
27. • •	• •	7.0MC (Unmod)	•	7.0MC	• •	A39 A40 A41	Turn BFO to "On" position and adjust generator to zero beat at 7.0MC. Turn BFO to "Off" position. Adjust for maximum deflection. Repeat steps 26 and 27 until maximum deflection is obtained on VTVM.

RF ALIGNMENT BANDS 8-15

• Alternate signal generator output to maintain less than 5 volt on VTVM at point <A>

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
28. 47U Resister in series with 100MMF capacitor	High side thru dummy to antenna receptacle. Low side to chassis.	8.0MC (Unmod)	8	8.0MC	DC probe to point <A>. Common to chassis.	A42 A43 A44	Turn BFO to "On" position and adjust generator to zero beat at 8.0MC. Turn BFO to "Off" position. Adjust for maximum deflection.
29. • •	• •	15.0MC	• •	15.0MC	• •	A45 A46 A47	Turn BFO to "On" position and adjust generator to zero beat at 15.0MC. Turn BFO to "Off" position. Adjust for maximum deflection. Repeat steps 28 and 29 until maximum deflection is obtained on VTVM.

RF ALIGNMENT BANDS 16-30

• Alternate signal generator output to maintain less than 5 volt on VTVM at point <A>

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
30. 47U Resister in series with 100MMF capacitor	High side thru dummy to antenna receptacle. Low side to chassis.	16.0MC (Unmod)	16	16.0MC	DC probe to point <A>. Common to chassis.	A48 A49 A50	Turn BFO to "On" position and adjust generator to zero beat at 16.0MC. Turn BFO to "Off" position. Adjust for maximum deflection.
31. • •	• •	30.0MC	30	30.0MC	• •	A51 A52	Turn BFO to "On" position and adjust generator to zero beat at 30.0MC. Turn BFO to "Off" position. Adjust for maximum deflection. Repeat steps 30 and 31 until maximum deflection is obtained on VTVM.

RF ALIGNMENT BANDS 1

• Alternate signal generator output to maintain less than 5 volt on VTVM at point <A>

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
32. 47U Resister in series with 100MMF capacitor	High side thru dummy to antenna receptacle. Low side to chassis.	0.6MC (Unmod)	1	0.6MC	DC probe to point <A>. Common to chassis.	A53 A54 A55 A56	Turn BFO to "On" position and adjust generator to zero beat at 0.6MC. Turn BFO to "Off" position. Adjust A53 so that core is in approximately same position as A24 and A25. Adjust A54, A55 and A56 for Maximum deflection. Two peaks may be found when adjusting A56. The correct peak will occur at a greater capacitance value. Adjust in a counter clockwise direction to increase capacitance.
33. • •	• •	1.4MC	• •	1.4MC	• •	A57 A58 A59	Turn BFO to "On" position and adjust generator to zero beat at 1.4MC. Turn BFO to "Off" position. Adjust for maximum deflection. Repeat steps 32 and 33 until maximum deflection is obtained on VTVM.

If the VFO unit becomes sufficiently misaligned as indicate by the procedure outlined under "Alignment of Dials With VFO", paragraph B3, the unit should be returned to the factory for permanent alignment. Temporary alignment may be attempted by a qualified technician only in case of emergency.

CAUTION: Do not, under any circumstances, remove the outer cylindrical cover. To do so will break the hermetic seal and expose the frequency corrector mechanism and the carefully compensated frequency-determining elements.

If the VFO is to be returned to the factory see instructions under "Complete VFO Removal".

ALIGNMENT INSTRUCTIONS • cont. •

VFO ALIGNMENT PROCEDURE

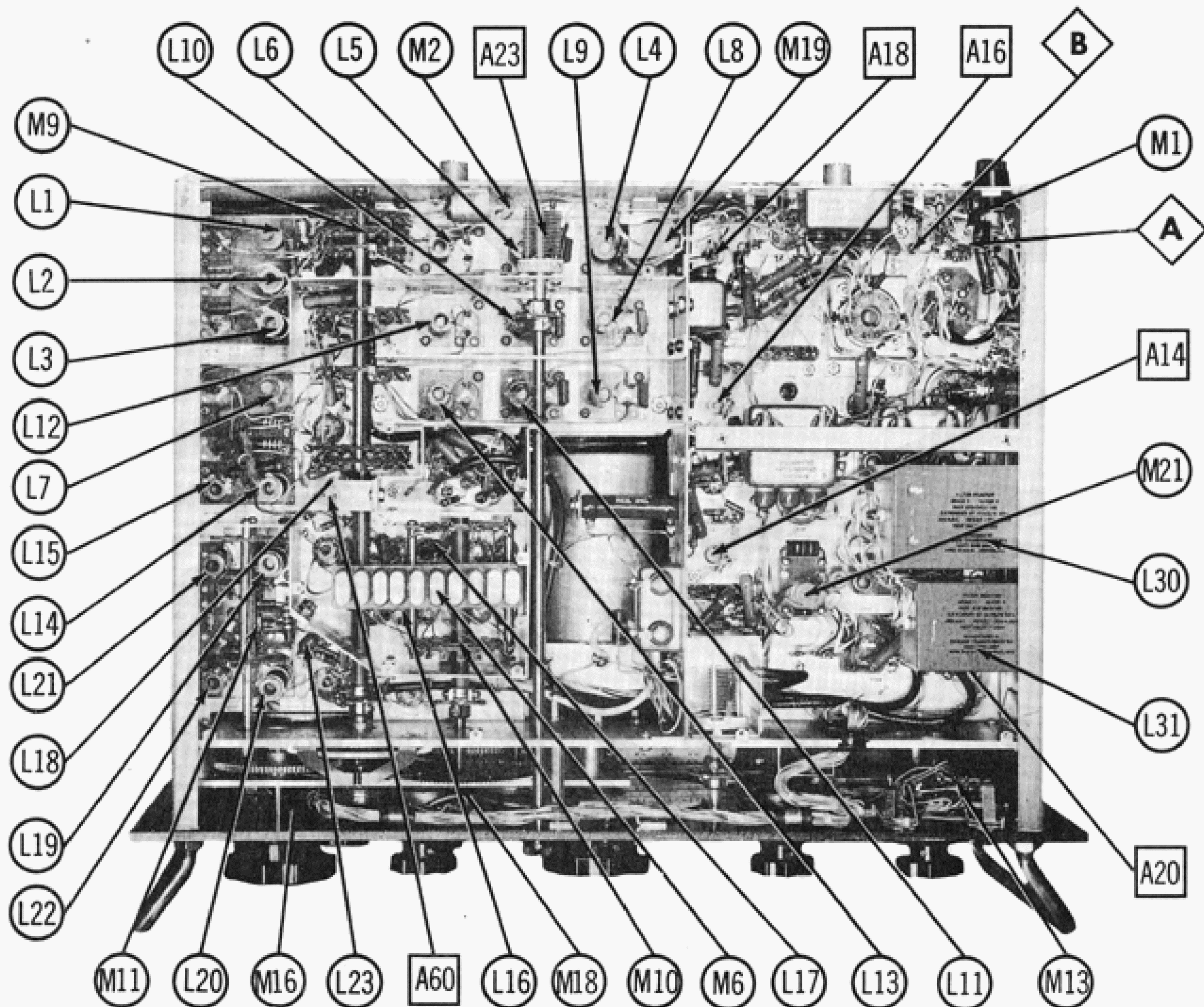
1. Set the BFO pitch line so that the white lines coincide (when lines coincide, BFO is set at 500KC). Turn calibrate to "Off" position.
2. A signal generator with an accuracy of $\pm 20\text{KC}$ at 1.5MC should be used.
3. Loosen set screws in VFO coupler and slide coupler hubs apart. Remove front panel of receiver and VFO mounting screws. Pull out the VFO and allow it to hang on the connecting wires. Fabricate a small circular dial having a linear scale from 0 to 100 completely around its outer edge. Mount the dial on the VFO shaft. Attach a small wire (use as pointer) to one of the VFO mounting screws. Let one division on dial equal one kilocycle.
4. Turn the set on and short antenna terminal to chassis. Since none of receivers tuned circuits are used in this alignment it will not be necessary to set the receiver dials.
5. Couple the signal generator 1.5MC output to pin 1 (grid 1) of 6BE6 (V5).
6. Locate the low frequency end point (2.0MC) of the VFO by rotating the VFO shaft clockwise to the last zero beat obtainable in that direction. (do not try to force VFO shaft after it reaches the stop at either end of its range.)
7. The VFO is now within 20KC of its 2.0MC setting. To adjust more accurately, remove the signal generator and connect a clip lead from the cold side of C92 (100KC oscillator output) to pin 1 (grid 1) of 6BE6 (V5). Turn calibrate to "On" position. Carefully turn VFO shaft to the nearest zero beat. The VFO is now set to exactly 2.0MC Place the VFO dial pointer at zero using care to retain the zero beat setting.
8. Turn VFO shaft exactly 10 turns counter clockwise > Locate zero beat by turning the VFO shaft a few divisions toward either side of the 10-turn mark.
9. Should zero beat occur on either side of the 10-turn mark, note the amount and direction of error by counting divisions between zero and pointer. Multiply the number of error divisions by 1.5.
10. Should zero beat occur at less than 10 turns, turn the VFO shaft counter clockwise by the number of divisions arrived at in step 9.
11. Should zero beat occur at more than 10 turns, turn the VFO shaft clockwise by the number of divisions arrived at in step 9.
12. Remove the hex plug from the front of oscillator. With the VFO adjustment tool (supplied with equipment) loosen the lock nut which becomes visible when hex plug is removed. Insert the screwdriver end of the adjustment tool into outer portion. Adjust trimmer screw until zero beat is again obtained. Tighten lock nut using care to retain zero beat.
13. The 2.0 and 3.0MC zero beat positions should now be exactly 10 turns apart. If this is not so, repeat the above procedure until they are. It will be necessary to zero dial pointer at initial zero beat position each time this procedure is repeated. Tighten lock nut after each trimmer adjustment.
14. After the 2 and 3MC endpoints of the VFO have been separated by exactly 10 turns, replace the hex plug, put the VFO in the receiver and replace the front panel. Align the receiver dials with VFO as outlined in paragraph B2 in "Alignment of Dials With VFO".

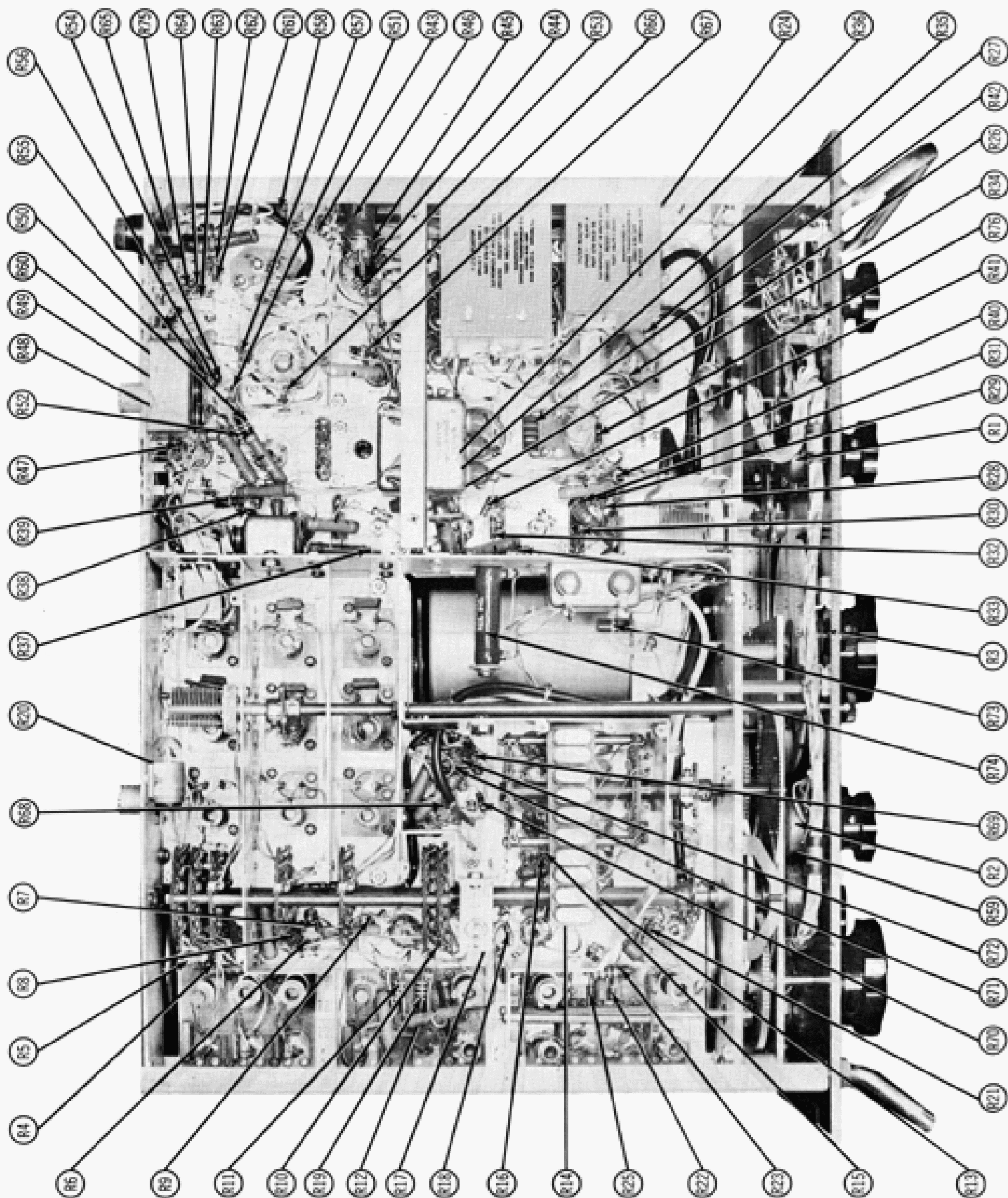
4MC BAD SUPPRESSION COIL ADJUSTMENT

Turn VFO to "On" position and tune in spurious signal at 1250KC. Adjust A60 for maximum attenuation of spurious signal.

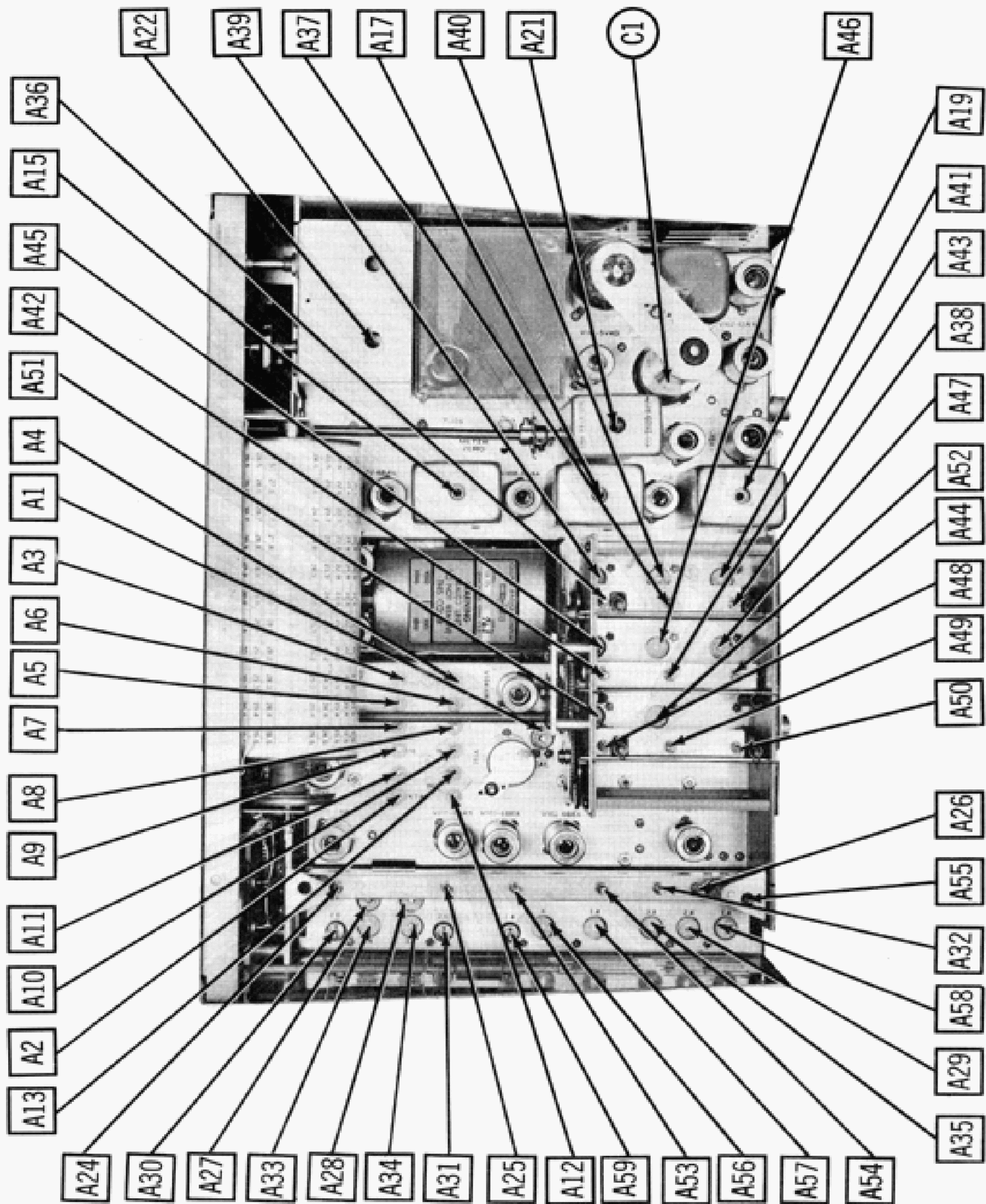
COMPLETE VFO REMOVAL

- A. Remove front panel and let it swing forward on the wires.
- B. Loosen set screws in flexible coupler. Pull coupler apart and remove center disc.
- C. Identify the VFO connecting wire so they may be reconnected correctly. Unsolder wires.
- D. Remove the three retaining screws that VFO to chassis.
- E. Slip the VFO back and tip the rear downward.
- F. The VFO may now be pulled from the receiver.





CHASSIS TOP VIEW RESISTOR-IDENTIFICATION



CHASSIS TOP VIEW INDUCTOR AND ALIGNMENT IDENTIFICATION

K4XL's **BAMA**

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