

3-8. BAND WIDTH CONTROL

The BAND WIDTH control is used to vary the selectivity of the receiver to fit receiving conditions. Six degrees of Selectivity are available, ranging from 250 cycles, for CW reception under crowded band conditions, to 10 kilocycles for maximum fidelity for broadcast reception. The six selectivity positions are shown on the BAND WIDTH control and indicate receiver selectivity at 6 db down. A seventh position on the control, marked "PHONO", disables all of the receiver circuits except the audio system for phonograph operation.

For broadcast reception, the BAND WIDTH control is normally set at "5 KC" or "10 KC", the positions affording broad selectivity. Selectivity may be progressively increased by turning the BAND WIDTH control to the positions marked "2.5 KC", "1.25 KC", ".5 KC", and ".25 KC". For reception of the crowded amateur and shortwave bands, it is generally advisable to sacrifice fidelity for greater selectivity, since the added selectivity reduces both adjacent-channel interference and background noise by attenuating the higher audio frequencies. Too much selectivity on AM signals, however, will attenuate the high audio frequencies to such an extent that the signal may become unintelligible as a result of excessive side-band cutting. When receiving CW signals, the sharpest selectivity position may be used without the loss of intelligibility experienced in AM reception.

3-9. PITCH CONTROL

The PITCH control operates the tuning slug in the BFO coil to vary the frequency of the beat frequency oscillator approximately 2.5 kc each side of its center frequency of 50 kc. The primary function of the PITCH control is to vary the pitch of the audible beat note when receiving CW signals. It is also used when receiving single-side band signals to vary the frequency of the reinserted carrier in the receiver.

3-10. BAND SELECTOR CONTROL

The BAND SELECTOR control operates the band switch to select the desired band of frequencies. The frequency range or band covered by each position of the BAND SELECTOR control is indicated directly on the control. The band in use on the main tuning and band spread tuning dials is illuminated for ease in tuning.

The BAND SELECTOR control performs three functions on each band: (1) it places the proper set of coils and sections of the main and band spread tuning capacitors into the circuit to cover the desired frequency range. (2) it selects the bias resistor in the cathode circuit of the 2nd RF amplifier stage to provide the proper gain for each band, and (3) it switches the 2nd conversion oscillators and 1st mixer plate to operate at the required first intermediate frequency (2075 kc on bands 1, 3, 4, 5, and 6; 1550 kc on band 2).

3-11. ANTENNA TRIMMER CONTROL

The ANTENNA TRIMMER control operates a variable capacitor connected across the secondary of the antenna coil of the band in use. This capacitor adjustment compensates for loading effects of various types of antenna installations.

3-12. VOLUME CONTROL

The VOLUME control adjusts the audio level at the speaker terminals and phones jack and, in addition, turns the receiver on and off. Clockwise rotation of the control turns the receiver on and increases the signal applied to the grid of the audio amplifier tube, thus increasing the receiver volume.

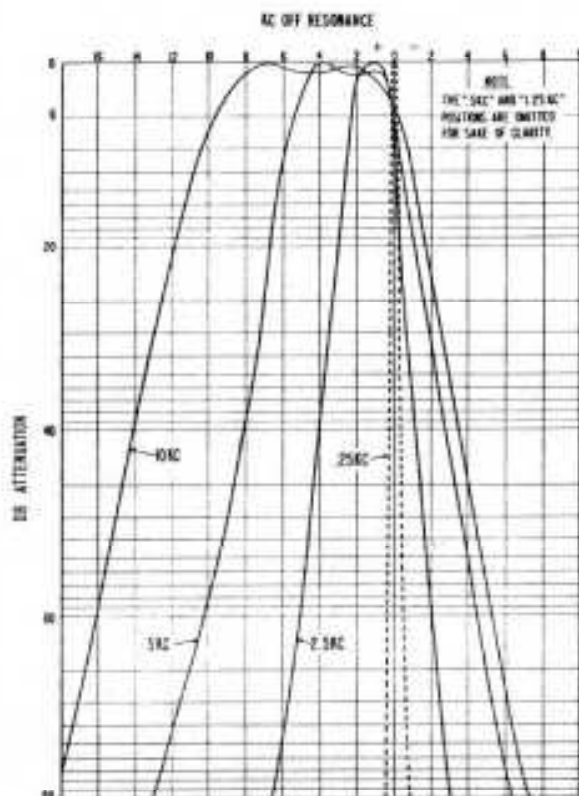


Fig. 6. IF Selectivity Curves

3-13. MAIN TUNING DIAL

The main tuning dial has six calibrated scales and a 24-division logging scale. Each division on the logging scale represents one complete revolution of the MAIN TUNING control. Since the metal skirt of the MAIN TUNING control is calibrated from 0 to 100, this method of tuning divides each scale on the main tuning dial into 2400 readable settings. Thus, by recording the settings of the logging scale and MAIN TUNING control, the receiver may be accurately reset to any desired frequency. A tuning lock to the right of the MAIN TUNING control permits positive locking action without affecting the frequency setting of the main tuning dial. To lock the main tuning dial, simply turn the locking knob clockwise.

IMPORTANT: The calibration on the main tuning dial will be accurate only if the band spread tuning gang is set at minimum capacity. This is accomplished by rotating the BAND SPREAD TUNING control counterclockwise until the dial pointer is aligned with the index marks at the high frequency end of the dial. If the band spread tuning gang is set at any setting other than minimum capacity, the additional band spread capacity, added to the main tuning capacity, would throw off the main tuning dial calibration because the receiver is calibrated with the band spread tuning gang set at minimum capacity.

The dial settings for the amateur bands are indicated on the main tuning dial by white dots and wavelength in meters (160, 80, 40, etc.). When tuning the amateur bands with the band spread dial, the main tuning dial must be set and locked at the setting corresponding to the desired amateur band.

3-14. BAND SPREAD TUNING DIAL

The band spread tuning dial contains a 24-division logging scale and six scales calibrated for the 160, 80, 40, 20, 15, and 11-10 meter amateur bands. The six scales are calibrated to read receiver frequency directly when the main tuning dial has been set to the index dot of the desired amateur band. If precise calibration accuracy is desired on the amateur bands, the main tuning dial should be more accurately set the means of the built-in 100 kc crystal calibrator as outlined in Section 4-4A, "Calibration of the Band Spread Dial".

Each division of the 24-division logging scale on the band spread dial represents one complete revolution of the BAND SPREAD TUNING control. Since the metal skirt of the BAND SPREAD TUNING control is calibrated from 0 to 100, this method of tuning divides each scale on the band spread dial into 2400 readable settings. Thus, by recording the settings of the logging scale and the BAND SPREAD TUNING control, the receiver may be accurately reset to any desired frequency. A tuning lock to the left of the BAND SPREAD TUNING control permits positive locking action without affecting the setting of the band spread tuning dial. To lock the band spread tuning dial, simply turn the locking knob clockwise.

In addition to its use on the amateur bands, the band spread tuning dial may also be utilized as a fine tuning adjustment over any portion of the frequency range on bands 2, 3, 4, 5, and 6. Fine tuning is accomplished as follows:

- (a) Set the band spread tuning gang at minimum capacity by rotating the BAND SPREAD TUNING control counterclockwise until the dial pointer is aligned with the index marks at the high frequency end of the dial.
- (b) Set the main tuning dial at the high frequency end of the range of frequencies to be covered and then slowly tune through the range using the BAND SPREAD TUNING control.

3-15. MONITOR CONTROL

The MONITOR control on the top rear of the chassis permits adjustment of the receiver sensitivity when monitoring your own transmitter signal. The MONITOR control is an auxiliary sensitivity control switched in the circuit only when the REC-STANDBY switch is set at "STANDBY", it replaces the SENSITIVITY control on the front panel which is switched out of the circuit during standby operation. When monitoring your transmitter signal, the receiver antenna should be disconnected by relay or switching device so the signal will not "block" or damage the receiver. As a further precaution against overloading, the MONITOR control should not be advanced any further than necessary to hear the transmitter signal. When it is not desired to monitor the transmitter signal, the MONITOR control should be set fully counterclockwise (zero sensitivity position) so that the receiver will be completely disabled when the REC-STANDBY switch is set at "STANDBY".

SECTION 4. OPERATION

4-1. AM RECEPTION

1. Set the front panel controls to their starting positions as outlined below.

VOLUME OFF
BAND SELECTOR At the desired band. (Band in use will be illuminated when receiver is turned on.)
SENSITIVITY 10 (maximum sensitivity)
BAND WIDTH 5 KC (2.5 KC or 10 KC if desired)
CW-AM-SSB AM
ANL OFF-ON OFF
AVC ON-OFF ON
CAL OFF-ON OFF
REC-STANDBY REC
ANTENNA TRIMMER . . . 0 (zero)
RESPONSE NORMAL (or as desired)

2. Loosen the tuning locks at the sides of the MAIN TUNING and BAND SPREAD TUNING controls by turning the LOCK knobs counterclockwise.

IMPORTANT

Before making any tuning adjustments with the MAIN TUNING or BAND SPREAD TUNING controls, it is essential that the dial pointers be properly indexed by means of the small knob located directly below each dial. This is accomplished by rotating the MAIN TUNING and BAND SPREAD TUNING controls fully clockwise and aligning the dial pointers with the index marks at the low frequency end of the dial.

3. Turn the receiver on by rotating the VOLUME control clockwise. The band in use on the main tuning and band spread tuning dials will light up indicating the receiver is operative. Adjust the VOLUME control for the desired volume level.
4. Set the band spread tuning gang at minimum capacity by rotating the BAND SPREAD TUNING control counterclockwise until the dial pointer is aligned with the index marks at the high frequency end of the dial. The band spread tuning dial may now be locked in position, if desired, to avoid disturbing its setting. The band spread tuning dial is calibrated for the 160, 80, 40, 20, 15, and 11-10 meter amateur bands. For convenience in tuning, the AM phone bands are indicated on the band spread dial by a wide line directly above their location on the dial. For fine tuning of the amateur and shortwave bands with the BAND SPREAD TUNING control, see Section 3-14. The BAND SPREAD TUNING control has no effect on standard broadcast reception (Band 1).

IMPORTANT

The frequency calibration of the main tuning dial will be correct only if the band spread tuning gang is set at minimum capacity as specified above.

5. Tune in the desired signal with the MAIN TUNING control, tuning for maximum indication on the "S" meter. The dial calibrations on all bands are located above the frequency markings. After the signal has been accurately tuned in, adjust the ANTENNA TRIMMER control for maximum indication on the "S" meter, and then set the VOLUME control for the desired volume level.

NOTE

The "S" meter indications will be correct only when the AVC switch is set at "ON", and the SENSITIVITY control is set at 10 (maximum sensitivity setting). If the SENSITIVITY control is set at a setting other than "10", AVC action will also be somewhat restricted.

6. Set the **BAND WIDTH** control for the desired degree of selectivity. For standard broadcast reception (Band 1), the control is normally set at "10 KC" for maximum fidelity. The positions marked "5 KC", "2.5 KC", "1.25 KC", ".5 KC", and ".25 KC" provide progressively increasing steps of selectivity. Note that as the selectivity of the receiver is increased, the background noise and interference from adjacent signals is reduced. Too much selectivity, however, will cause excessive side-band cutting. While side-band cutting reduces fidelity, it may be frequently preferable to sacrifice naturalness of reproduction in favor of communications effectiveness. When changing the position of the **BAND WIDTH** control from a broad to a narrower response (for example: from "2.5 KC" to "1.25 KC"), a slight readjustment of the tuning controls may be necessary to recenter the signal in the i-f pass-band.
7. Set the **RESPONSE** control for the desired tonal quality.
8. If it is desired to operate with **AVC** off, set the **AVC** switch at "OFF", set the **VOLUME** control to a well advanced position, and vary the receiver volume level by means of the **SENSITIVITY** control to avoid "blocking" by strong signals.
9. If severe electrical disturbances or ignition or other types of pulse-type noise interfere with reception, set the **ANL** switch at "ON" to place the automatic noise limiter circuit in operation.
10. The receiver may be disabled without turning it off by setting the **REC-STANDBY** switch at "STANDBY". In this position, the r-f and i-f stages are cut off but the heater and plate supplies remain operative for instant reception. To resume reception, simply return the switch to the "REC" position.

4-2. CW RECEPTION

For CW reception, set the **VOLUME** control at a well advanced position and vary the volume level of the receiver by means of the **SENSITIVITY** control, taking care not to advance the control to a point where strong signals will cause excessive "thumping" (overloading). The receiver may be operated with **AVC** on or off, as desired. (See Section 3-4.) Operation of the receiver with **AVC** on is highly desirable since it not only minimizes fading but also prevents blasting when tuning from a weak to a strong signal.

CW signals are made audible by the heterodyning action of the beat oscillator with the incoming signal. The beat oscillator is set at a frequency slightly different from the second-intermediate frequency of 50 kc, the difference being equal to the pitch of the audible note desired. To adjust the beat oscillator frequency, first tune in a steady, unmodulated carrier with the beat oscillator turned off (CW-AM-SSB switch set at "AM"), the **AVC** switch set at "ON", and the **BAND WIDTH** control set at ".25 KC" (the sharpest selectivity position). If desired, the built-in crystal calibrator may be used as the signal source as it provides a suitable carrier at every multiple of 100 kc on the dial. The crystal calibrator is made operative by setting the **CAL OFF-ON** switch at "ON". Adjust the receiver tuning to the carrier frequency as indicated by a maximum indication on the "S" meter. (This centers the carrier in the i-f passband.) Then turn on the beat oscillator by setting CW-AM-SSB switch at "CW" and adjust its frequency by means of the **PITCH** control (leaving the receiver tuning unchanged) to give a pleasing beat note. The beat oscillator may be set on either the high- or low-frequency side of zero beat. (The beat oscillator operates on the high side when the **PITCH** control is set at a position to the right of "0", and on the low side when the **PITCH** control is set at a position to the left of "0".) After the **PITCH** control is set, turn off the crystal calibrator by setting the **CAL OFF-ON** switch at "OFF", tune in a CW signal, and adjust the **ANTENNA TRIMMER** control for maximum loudness. With the receiver in the sharpest selectivity position, CW signals will drop in and out rapidly as the receiver is tuned across a band, and a slow rate of tuning is highly desirable. Once the **PITCH** control has been set, it need not be reset for each CW signal.

NOTE

If a CW signal is tuned in with the **BAND WIDTH** control at a setting other than ".25 KC", it may be necessary to slightly readjust the receiver tuning when changing to a narrower response in order to properly position the signal in the i-f pass-band.

The setting of the **BAND WIDTH** control for CW reception is generally best determined by receiving conditions. Note that as the selectivity of the receiver is increased (**BAND WIDTH** control varied in steps from the "10 KC" to the ".25 KC" position), the background noise and adjacent-channel interference is considerably reduced. For CW reception, the sharpest selectivity position may be used without loss of intelligibility experienced in AM reception.

The **RESPONSE** control and automatic noise limiter (ANL) circuit can be used to great advantage on CW reception, just as on AM reception, to reduce the effects of background noise and electrical interference. For CW reception, the "COMM 1" and "COMM 2" positions of the **RESPONSE** control can prove very effective in improving the signal-to-noise ratio by attenuating both the lower and higher audio frequencies. Maximum attenuation of these frequencies is obtained with the **RESPONSE** control set at "COMM 2".

4-3. SINGLE SIDEBAND RECEPTION

Single-sideband signals are transmitted with little or no carrier, and it is necessary to reinsert the carrier in the receiver before proper reception is obtained. In the SX-88 receiver, this is accomplished in the 50 kc i-f system by injecting the beat oscillator signal at the input of the second-detector. A single-sideband signal can be identified by its unintelligibility, and by a severe variation in the "S" meter indication corresponding to the speech modulation.

For single-sideband reception, set the AVC switch at "ON", the CW-AM-SSB switch at "SSB", **RESPONSE** control at "COMM 1" or "COMM 2", and the **BAND WIDTH** control at either "1.25 KC" or "2.5 KC", depending upon adjacent-channel interference and noise. Set the **SENSITIVITY** control at a well advanced position and vary the receiver volume level by means of the **VOLUME** control. Initially set the **PITCH** control at either "0", or the position marked "4" to the right of "0". The single-sideband signal will be intelligible at only one of these two settings, the proper setting depending upon the sideband being transmitted. If the signal is not intelligible after tuning is completed as outlined below, set the **PITCH** control to the other setting and repeat the tuning procedure.

Tune in the single-sideband signal for maximum loudness with as good intelligibility as possible. (This centers the signal in the i-f passband.) After the signal is properly tuned in, adjust the **ANTENNA TRIMMER** control for maximum loudness and then very carefully adjust the **PITCH** control for best intelligibility. If the **PITCH** control is improperly set, the speech will sound high- or low-pitched, or very distorted. Best intelligibility will be obtained with the **PITCH** control set very close to its initial setting, usually not more than 1/2 division on either side of the initial setting.

The "1.25 KC" position of the **BAND WIDTH** control permits reception of modulating frequencies up to about 1500 cycles. For reception of modulating frequencies higher than 1500 cycles, set the **BAND WIDTH** control to the positions marked "2.5 KC", "5 KC", or "10 KC", depending on the degree of fidelity desired; maximum fidelity is obtained in the "10 KC" position.

4-4. USE OF CRYSTAL CALIBRATOR

The built-in 100 kc crystal calibrator permits accurate dial calibration over any portion of the main and band spread tuning dials by a comparison of the dial calibrations with the marker signals which appear at every multiple of 100 kc on the dial. Any calibration adjustment required can be made by adjustment of the dial pointer from the front of the receiver.

IMPORTANT

Before making any calibration adjustment, it is essential that the main tuning and band spread tuning dial pointers be properly indexed. This is accomplished by rotating the **MAIN TUNING** and **BAND SPREAD TUNING** controls fully clockwise and aligning the dial pointers with the index marks at the low frequency end of the dial by means of the small knob located directly below each dial.

A. CALIBRATION OF THE BAND SPREAD DIAL

1. Set the band spread tuning dial at a convenient multiple of 100 kc at the high frequency end of the band in use. For example: 2000 kc on 160M, 4000 kc on 80M, 7300 kc on 40M, 14,400 kc on 20M, 21,500 kc on 15M and 29,800 on 10M. (The band spread tuning dial is calibrated in kc.)
2. Set the main tuning dial to the index dot of the desired amateur band.
3. Set the CW-AM-SSB switch at "CW", the **PITCH** control at "0", and the **CAL OFF-ON** switch at "ON".

4. Very carefully adjust the MAIN TUNING control for exact frequency as indicated by "zero beat" and then lock the main tuning dial in place to avoid disturbing its setting. The band spread tuning dial is now accurately calibrated and a "zero beat" should be obtained at every multiple of 100 kc on the band in use. For example, on the 80 meter amateur band, a "zero beat" should be obtained at 3500, 3600, 3700, 3800, 3900, and 4000 kc.
5. The procedure outlined in Steps 1 through 4 above provides average calibration accuracy over the entire frequency range of the band in use. For precise calibration accuracy over a particular section of the band, the procedure is identical except that the band spread dial is set at a multiple of 100 kc near the desired frequency or range of frequencies, instead of at the high end of the band as in Step 1.

B. CALIBRATION OF THE MAIN TUNING DIAL

1. Turn the BAND SPREAD TUNING control counterclockwise until the dial pointer is aligned with the index marks at the high frequency end of the dial. Then lock the band spread dial in place to avoid disturbing its setting.
2. Set the main tuning dial at a convenient multiple of 100 kc near the desired frequency or range of frequencies. (The main tuning dial is calibrated in mc.) To determine the nearest 100 kc multiple, simply remember that 100 kc is equal to one-tenth mc. For example, from 2.0 to 3.0 mc on band 2, the 100 kc multiples are 2.0 mc, 2.1 mc, 2.2 mc, 2.3 mc, etc.
3. Set the CW-AM-SSB switch at "CW", and the PITCH control to "0". Then set the CAL OFF-ON switch at "ON" and very carefully adjust the MAIN TUNING control for a "zero beat". After "zero beat" is obtained, very carefully index the main tuning dial pointer (by means of the small knob directly below the dial) with the nearest 100 kc multiple on the dial.

4-5. USE OF "S" METER

The "S" meter provides a visual means of determining whether or not the receiver is properly tuned, as well as an indication of the relative signal strength. The "S" meter circuit consists of a DC milliammeter connected in series with the plate lead to the 1st RF amplifier tube, the grid of which is controlled by AVC voltage. Since the plate current of this tube varies with the strength of the incoming signal, the meter will indicate relative signal strength. The "S" meter is calibrated in microvolts, "S" units from 1 to 9, and in decibels above S-9 to +40 db. The indications on the "S" meter will be correct only when the SENSITIVITY control is set at "10" (maximum sensitivity), and the AVC switch is set at "ON".

The limitations of the microvolt scale should be fully appreciated before any assumption as to the indicated signal voltages is accepted. The meter has been calibrated in microvolts of signal strength as developed at the antenna input terminals when terminated in a 52-ohm load, on bands 2 and 3. The microvolt scale will be somewhat less accurate under other load conditions and on bands 1, 4, 5, and 6.

4-6. SERVICE OR OPERATING QUESTIONS

For further information concerning operation or servicing of your receiver, contact your Hallicrafters dealer. The Hallicrafters Co. maintains an extensive system of Authorized Service Centers where any required service can be performed promptly and efficiently at a nominal charge. For the location of the one nearest you, consult your local dealer or telephone directory. Make no service shipments to the factory as the Hallicrafters Co. will not accept the responsibility for unauthorized shipments.

The Hallicrafters Co. reserves the privilege of making revisions in current production of equipment and assumes no obligation to incorporate these revisions in earlier models.

SECTION 5. ALIGNMENT

This receiver has been carefully aligned at the factory by specially trained personnel using precision equipment. Alignment of the receiver should not be attempted until all other possible causes of faulty operation have been investigated. Alignment should not be required unless the receiver has been tampered with or unless component parts have been replaced in the r-f or i-f stages. Alignment should be made only by persons familiar with communications receivers and experienced in their alignment. Refer to Figs. 10 and 11 for the location of all alignment adjustments.

5-1. EQUIPMENT REQUIRED

1. Vacuum tube voltmeter (VTVM) or other high impedance DC voltmeter.
2. Signal generator covering 50 KC to 30 MC.
3. Non-metallic alignment tool for IF alignment with dimensions shown in Fig. 7.
4. Alignment tools for RF alignment.
5. Output meter (or AC scale of VTVM or other suitable meter). Connect the output meter to the appropriate speaker terminals. The receiver output should be properly terminated with a dummy load if a VTVM is used.

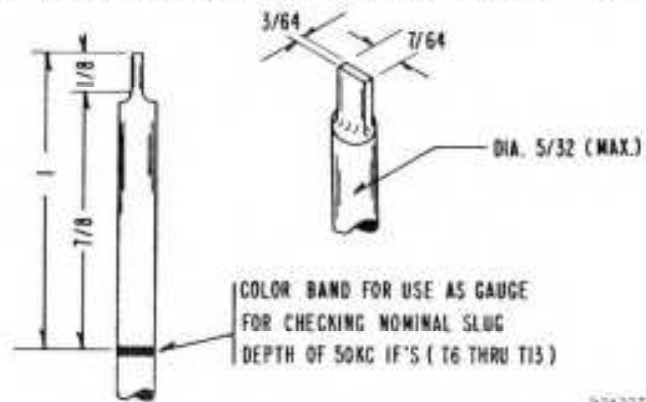


Fig. 7. IF Alignment Tool

5-2. INITIAL CONTROL SETTINGS

Band Selector	As indicated in chart.
Sensitivity and Volume	10 (maximum)
Band Width	As indicated in chart.
CW-AM-SSB	AM
ANL, AVC, and Cal.	Off
Rec-Standby	Rec
Response	Normal
Main Tuning and Band Spread Tuning Dials	At high frequency end

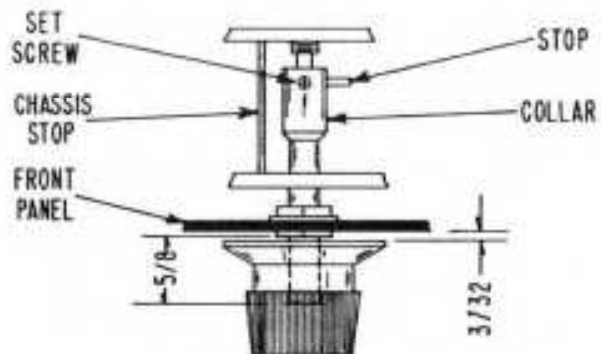


Fig. 8. Pitch Control

5-3. ALIGNMENT PROCEDURE

Step	Dummy Antenna	Signal Generator Connections	Signal Generator Frequency	Band Selector Setting	Output Connections	Band Width Setting	Remarks
50 KC IF ALIGNMENT							
1	Direct	Disconnect wire lead from terminal 4 of T3 (Fig. 11). Connect high side of generator to lead and low side to chassis.	50 KC (unmod)	1	VTVM DC probe to test point "A" (detector load resistor). See Fig. 11. Common to chassis.	.25 KC	Adjust T6, T7, T8, T9, T10, T11, T12, and T13 (50 KC IFs) for maximum indication, maintaining approx. 1 volt reading on VTVM. It is possible to obtain resonance at two different positions of the tuning slug. In the correct position, the top of the slug is approx. 7/8" from top of coil retaining clip. See Fig. 7.
BFO ADJUSTMENT							
2	"	"	"	"	(Use 100-volt or higher range for Step 2.)	"	Set CW-AM-SSB switch at "CW". Using speaker as indicator, adjust Pitch control for "zero beat". If knob reads zero and has equal rotation either side of zero, no further adjustment is required. If not, remove knob and loosen set screw and stop on collar. (See Fig. 8.) Adjust L31 (BFO coil) for "zero beat" thru hollow collar. Then position collar so that stop on collar is diametrically opposite chassis stop and so that Pitch control shaft protrudes approx. 5/8" from panel bushing as shown in Fig. 8. Tighten set screw and stop and position knob on shaft so that knob reads zero and so that rear of knob is approx. 3/32" from front panel. When properly positioned, tighten knob set screws. Next set CW-AM-SSB switch at "SSB" and adjust L32 (BFO amp coil) for maximum indication on VTVM. Switching from "SSB" to "CW" should produce approx. an 8 to 1 voltage change (decreasing). After completing Step 2, return CW-AM-SSB switch to "AM".

Step	Dummy Antenna	Signal Generator Connections	Signal Generator Frequency	Band Selector Setting	Output Connections	Band Width Setting	Remarks
AVC AMP. ADJUSTMENT							
3	"	"	"	"	VTVM DC probe to test point "B" (AVC bus). See Fig. 11. Common to chassis.	10 KC	Tune generator slowly thru 50 KC to determine IF passband. Then set generator frequency to center of passband. Next set AVC switch at "ON" and increase generator output to overcome delay bias on AVC amp tube. Adjust L28 (AVC amp coil) for maximum AVC voltage as indicated on VTVM. Maintain approx. 1 volt reading on VTVM. After completing Step 3, reconnect lead to terminal 4 on T3 and return AVC switch to "OFF".
2075 KC IF ALIGNMENT							
4	"	Remove gang housing cover and connect high side of generator to test point "C" (stator of section C1F of main tuning gang). See Fig. 10. Low side to frame of gang.	2075 KC (mod)	"	Output meter across appropriate speaker terminals. (VTVM to test point "A" if it desired to monitor detector voltage.)	"	Tune generator slowly thru 2075 KC to determine IF passband. Then set generator to center of passband, using sufficient generator output to obtain approx. 1/2 watt receiver output. If no output is obtained, the 2125 KC crystal oscillator may not be oscillating and it will be necessary to turn up the generator output
and adjust the 2125 KC crystal activity adjustment (bottom slug of T5) until output is obtained. Adjust for maximum output by adjusting the signal generator frequency, crystal activity (bottom slug of T5) and the 2075 KC IFs (top and bottom slugs of T1 and T3). Note that the signal suddenly disappears when the crystal activity slug is turned into the coil and gradually drops in level when the slug is backed out of the coil. Set the crystal activity adjustment (bottom slug of T5) for half output on the gentle slope side of maximum response. Then set the generator as near the center of the IF passband as possible and adjust the top and bottom slugs of T1 and T3 for maximum output. Tune through the passband and observe the shape of the response. If it is symmetrical the adjustment is completed; if not, reset the generator frequency near the center of the passband and repeak T1 and T3.							
1550 KC IF ALIGNMENT							
5	"	"	1550 MC (mod)	2	"	"	Adjust the signal generator frequency, the 1500 KC crystal activity adjustment (top slug of T5), and the 1550 KC IFs (top and bottom slugs of T2 and T4) using the same general procedure outlined in Step 4 for the 2075 KC IF.
IF SENSITIVITY CHECK							
6	With the generator connected as in Step 4 and modulated 30% at 400 cycles, the IF input required for 1/2 watt receiver output should be 100 microvolts or less at 2075 KC (Band 1) and 50 microvolts or less at 1550 KC (Band 2). This assumes the crystal activity is set for half of maximum response as outlined in Steps 4 and 5 above.						
RF ALIGNMENT							
Before proceeding with the RF alignment:				Set the SENSITIVITY and VOLUME at "10" (maximum), BAND WIDTH at "5 KC", AVC, ANL, and CAL at "OFF", CW-AM-SSB at "AM", REC-STANDBY at "REC", and RESPONSE AT "NORMAL".			
A. Rotate the MAIN TUNING and BAND SPREAD TUNING controls fully clockwise and align the dial pointers with the index marks at the low frequency end of the dial by means of the small knob directly below each dial.				The oscillator frequency is higher than the signal frequency on all bands.			
B. Then rotate the BAND SPREAD TUNING control counterclockwise until the dial pointer is aligned with the index marks at the high frequency end of the dial. Lock the band spread dial in position to avoid disturbing its setting.							
RF alignment must be made with the bottom shield cover in place.							
Use a modulated signal.							
Connect the output meter across the appropriate speaker terminals. (Connect the VTVM to test point "A" if it is desired to monitor the detector voltage.) Maintain a 1/2 watt receiver output.							

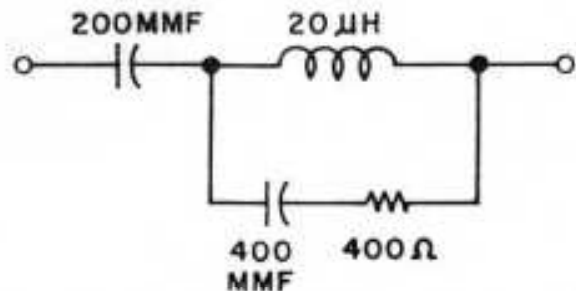


Fig. 9. RTMA Dummy Antenna

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RF ALIGNMENT (Cont.)					
Step	Dummy Antenna	Signal Generator Connections	Generator & Receiver Frequency	Band Selector Setting	Adjust for Maximum
7	RTMA Dummy (Fig. 9)	High side to antenna terminal A1. Low side to A2. Jumper between A2 and G.	1.50 MC	1	C114 (osc. trimmer), C29 (mixer trimmer), and ANTENNA TRIMMER control on front panel.
			.56 MC	"	L24 (osc. slug) and L18 (mixer slug)
8	47-ohm carbon resistor	"	2.8 MC	2	C111 (osc. trimmer), C28 (mixer trimmer), C16 (RF trimmer), and ANTENNA TRIMMER control.
			1.8 MC	"	L23 (osc. slug), L17 (mixer slug), L11 (RF slug), and L5 (antenna slug)
9	"	"	1.55 MC	"	Set main tuning gang fully closed. Set generator frequency for maximum IF response, using sufficient generator output to obtain 1/2 watt receiver output. Then adjust L6 (1550 KC trap) for maximum rejection (minimum output indication).
10	"	"	5.1 MC	3	C107 (osc. trimmer), C27 (mixer trimmer), C15 (RF trimmer), and ANTENNA TRIMMER control.
			3.2 MC	"	L22 (osc. slug), L16 (mixer slug), and L10 (RF slug)
11	"	"	9.0 MC	4	C102 (osc. trimmer), C26 (mixer trimmer), C14 (RF trimmer), and ANTENNA TRIMMER control.
			5.6 MC	"	L21 (osc. slug), L15 (mixer slug), and L9 (RF slug)
12	"	"	16.5 MC	5	C99 (osc. trimmer), C25 (mixer trimmer), C12 (RF trimmer), and ANTENNA TRIMMER control.
			10.3 MC	"	L20 (osc. slug), L14 (mixer slug), and L8 (RF slug)
13	"	"	30.0 MC	6	C93 (osc. trimmer), C23 (mixer trimmer), C11 (RF trimmer), and ANTENNA TRIMMER control.
			18.7 MC	"	L19 (osc. slug), L13 (mixer slug), and L7 (RF slug)
SENSITIVITY ADJUSTMENT					
14	<p>Set the AVC switch at "ON", BAND SELECTOR at Band 3, and the main tuning dial to 3.2 MC. Short the antenna terminals and adjust the "S" METER ADJ control at the rear of the receiver until the meter pointer is in line with the left-hand index marks on the meter. (NOTE: With the receiver turned off, the "S" meter pointer should be in line with the right-hand index marks on the meter. If not, remove the "h" insignia directly below the meter and turn the adjustment screw as required.) Set the signal generator to 3.2 MC, adjust the generator for 50 microvolt output, and then adjust the bottom slug of T5 for 50 microvolts on the "S" meter. CAUTION: The bottom slug of T5 should be set so that the crystal oscillator is operating on the gentle slope portion of its tuning characteristic.</p> <p>Switch the BAND SELECTOR to Band 2, set the generator and main tuning dial at 1.8 MC, adjust the generator for a 50 microvolt output, and then adjust the top slug of T5 for 50 microvolts on the "S" meter, again operating on the gentle slope portion of the oscillator tuning characteristic.</p>				

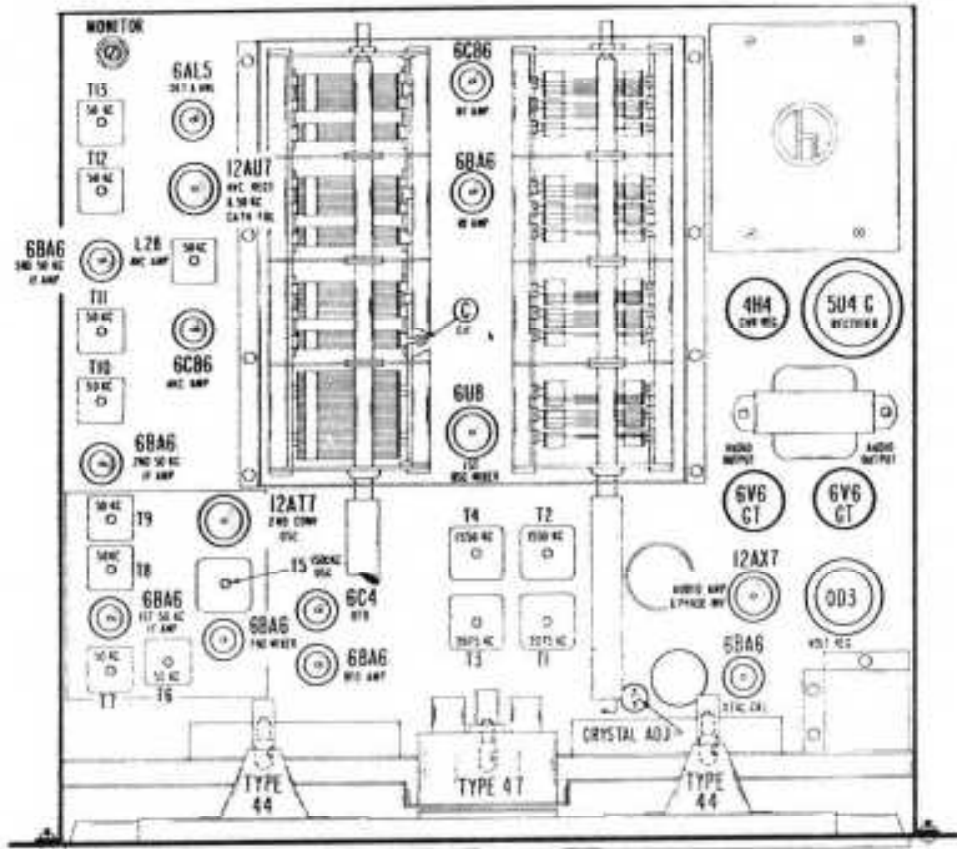


Fig. 10. Top View of Chassis Showing Location of Alignment Adjustments, Tubes, and Dial Lamps

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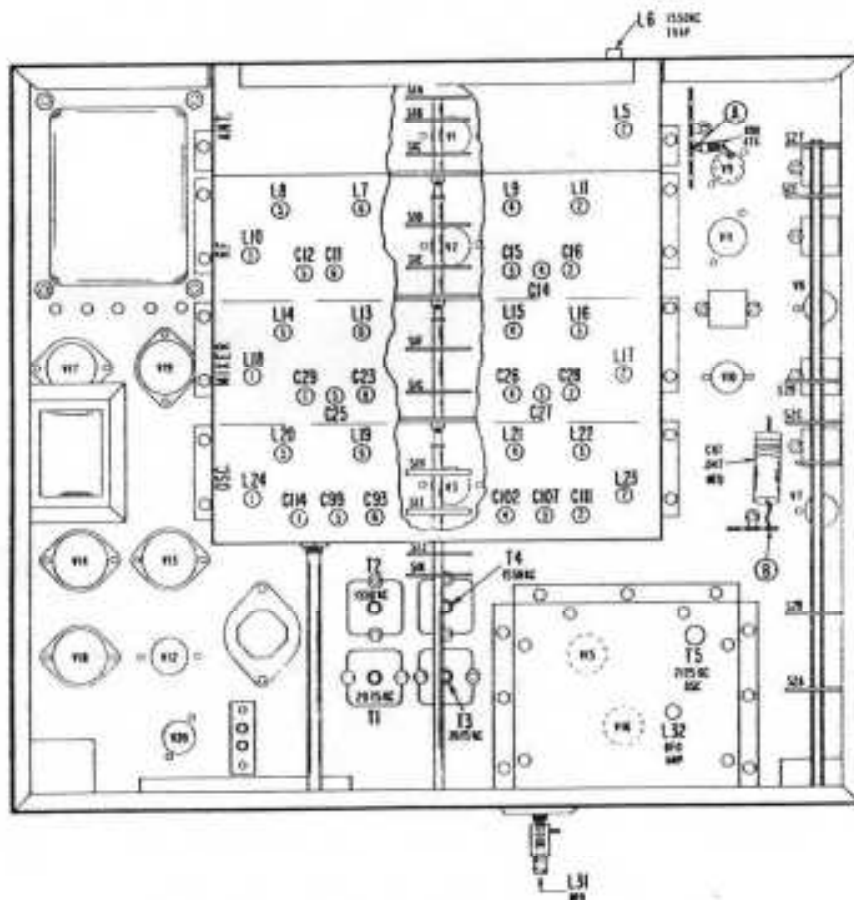


Fig. 11. Bottom View of Chassis Showing Location of Alignment Adjustments and Tubes