nals within the selected band. The vertical pointer on the slide-rule dial is operated by this control. The dial has six calibrated and individually illuminated scales, one for each of the Converter, 80, 40, 20, 15 and 10 meter bands covered by the receiver. A seventh band, which uses the dial area covering the 10 meter band scale, is purposeful for zero-beating the 10 MC WWV signal for intentions of checking and adjusting the 100 KC crystal calibrator. All bands are illuminated in this position.

It should be noted that the large slide rule dial spreads the amateur bands over most of the total length of the calibrated dial. When checked against the 100 KC crystal calibrator, and dial correction made with the POINTER RESET control, the dial calibration is extremely accurate. This is especially true on the narrower 80, 40, 20 and 15 meter amateur bands. On these bands the receiver has a dial graduation every 5 kilocycles. The dial accuracy is somewhat less on the 10 meter band, where there is a dial graduation every 25 KC and on the converter band with 50 KC graduations.

SECTION V
OPERATION

5-1. AM RECEPTION.

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

RF GAIN	10 (maximum sensitivity)
BAND SELECTOR	At the desired amateur band
AF GAIN	0 (minimum volume)
AVC ON-OFF	ON
AVC FAST-SLOW	As desired
NOISE LIMITER-OFF	OFF
SELECTIVITY	5 KC
RESPONSE	POWER OFF
RECEIVE-STANDBY	RECEIVE
NOTCH DEPTH	OFF
CALIB. -OFF	OFF
POINTER RESET	As adjusted
ANT. TRIMMER	As adjusted
PITCH CONTROL	As adjusted
NOTCH FREQ.	As adjusted

2. Turn the receiver on by rotating the RESPONSE control clockwise and set it at either the AM "UPPER" or "LOWER" sideband position. The tuning dial and "S" meter will be illuminated, indicating the receiver is operative, and the band selected by the BAND SELECTOR will be the only illuminated band on the slide-rule dial. Rotate the AF GAIN control clockwise for the desired volume level.

3. Tune in an AM signal with the tuning control, tuning for maximum indication on the "S" meter. Adjust the ANT. TRIMMER control for maximum indication on the "S" meter. After the signal has been accurately tuned in, readjust the AF GAIN control as desired.

NOTE

The "S" meter indications will be correct only when the AVC switch is set at ON, and the RF GAIN control is set at or near 10 (maximum sensitivity). Setting the RF GAIN control at a setting other than "10" will also somewhat restrict AVC action.

4. Set the SELECTIVITY control for the desired degree of selectivity. For AM reception, the control can be set to 5 KC for maximum fidelity. The positions marked 3 KC, 2 KC, 1 KC, .5 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, may cause excessive sideband cutting. While sideband cutting reduces fidelity, it may be frequently preferable to sacrifice naturalness of reproduction in favor of communications effectiveness. When changing the position of the SELECTIVITY control from a broad to a narrower response (for example: from "2 KC" to "1 KC"), a slight readjustment of the tuning controls may be necessary to recenter the signal in the IF passband.

5. Set the RESPONSE control at either AM "LOWER" or "UPPER" sideband position.

6. If it is desired to operate with AVC off, set the AF GAIN control to a well advanced position, and vary the receiver volume level by means of the RF GAIN control, taking care not to advance the control to a point where strong signals will cause "blocking".

7. If severe electrical disturbances, ignition or other types of pulse type noise interfere with reception, set the NOISE LIMITER switch at "ON" to place the automatic noise limiter circuit in operation.

8. The receiver may be disabled without turning it off by setting the RECEIVE-STANDBY switch at "STANDBY". In this position, the RF, the 1650 KC IF and 50. 75 KC IF stages are cut off but the heater and plate supplies remain operative for instant reception. To resume reception, simply return the switch to the "RECEIVE" position.

9. An undesired signal near the frequency of the desired signal will heterodyne with it to produce an audible beat note equal to their frequency difference. This type of heterodyne interference can be eliminated by using the notch filter circuit. Simply rotate the NOTCH DEPTH control clockwise to its "MAX" position, and adjust the NOTCH FREQ. control to "notch out" the interfering signal. Readjust the NOTCH DEPTH control as necessary to obtain maximum rejection of the interfering signal.

CAUTION

It is possible to eliminate the heterodyne by notching out the desired carrier in place of the undesired signal or carrier. When this occurs an AM signal will sound like a single sideband suppressed carrier transmission.

10. In shortwave reception, it frequently happens that transmission conditions are different for waves of slightly different frequencies. As a result, in the case of voice modulated transmissions, AM particularly, which involve sideband frequencies differing slightly from the carrier frequency, the carrier and sideband components may not be received in the same relative amplitudes and phases they had at the transmitter. This effect, known as selective fading, causes severe distortion of the signal.

    This type of distortion can be reduced considerably by utilizing the selectable sideband feature of the SX-101A receiver operating in an "Exalted Carrier" mode, i. e., the transmitted carrier is positioned out of the receivers IF passband along with one sideband producing a suppressed carrier single sideband signal. The carrier is subsequently reinserted by the receivers BFO and the signal is detected in the same manner as in the case of a SSB signal. The detailed procedure for this type of operation is as follows:

    a. Set the RESPONSE switch to SSB-CW "UPPER" or "LOWER" sideband and the PITCH control to "0".

    b. Carefully tune in the desired signal for "zero beat".

    c. If the receiver BFO is set up properly (See paragraph 5-6) the RESPONSE switch may be alternately set to either the "UPPER" or "LOWER" SSB-CW sideband positions without affecting the "zero-beat" condition.

    d. Leave the RESPONSE control in the SSB-CW "UPPER" or "LOWER" sideband position that affords the best reception.

5-2. CW RECEPTION.

For CW reception, the receiver may be operated with AVC on or off, as desired. 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. To operate with AVC on, set the AVC switch at "ON", set the RF GAIN control to a well advanced position, and regulate the receiver volume level by means of the AF GAIN control. To operate with AVC off, set the AVC switch at "OFF", set the AF GAIN control at a well advanced position, and vary the receiver volume level by means of the RF GAIN control, taking care not to advance the control to a point where strong signals cause excessive "thumping" (overloading).

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. 75 KC, the difference being equal to the pitch of the audible note desired.

For the reception of CW signals, set the SELECTIVITY control at one of the sharper selectivity positions (2 KC, 1 KC, or . 5 KC), set the RESPONSE control at SSB-CW "UPPER" or "LOWER" sideband, and set the PITCH control at any setting from "0" to "4" on either side of zero, and then tune in the signal for a pleasing beat note.

NOTE

Because of the effective band spread on the bands on this receiver, CW signals are easily tuned when the SELECTIVITY control is set at ". 5 KC".

The beat oscillator may be set on either the high or low frequency side of zero beat. (The oscillator operates on the low side when the PITCH control is set at a position to the left of zero and on the high side when the PITCH control is set at a position to the right of zero.) It may be necessary, after setting the PITCH control, to readjust the receiver tuning slightly to properly position the signal in the IF passband. Alternately adjust the PITCH control and the receiver tuning for a maximum audible signal. With the receiver in the sharpest selectivity position, CW signals will drop in and out more rapidly and a slower rate of tuning is recommended. Once the PITCH control has been set, it need not be reset for each CW signal unless a change of pitch is desired.

NOTE

If the SELECTIVITY control is changed to a different position, it may be necessary to readjust the receiver tuning slightly when changing to a narrower selectivity position in order to properly position the signal in the IF passband.

The setting of the SELECTIVITY control for CW reception is generally best determined by receiving conditions. Note that as the selectivity of the receiver is increased (SELECTIVITY control varies from the "5 KC" to the ". 5 KC" position), the background noise and adjacent-channel interference is considerably reduced and tuning is sharper. For CW reception, the sharpest selectivity position may be used without the loss of intelligibility experienced in AM reception.

5-3. 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-101A receiver, this is accomplished by mixing the 50. 75 IF with the BFO in the product detector circuit. A single-sideband signal (SSB) can be identified by its unintelligibility, or monkey chatter, and by severe variations in the "S" meter indication corresponding to the speech modulation.

For the reception of single-sideband signals, set the PITCH control at "0", AVC switch at "ON", and SE-

LECTIVITY control at either "2 KC" or "3 KC", depending upon adjacent channel interference and noise. Set the RF GAIN control at maximum and vary the receiver volume level by means of the AF GAIN control. In the case of extremely strong signals it may be desirable to reduce the RF GAIN slightly to prevent overload and cross modulation effects. Set the RESPONSE control at SSB-CW "UPPER" or "LOWER" sideband. The single-sideband signal will be intelligible in only one of these two positions, the proper position depending upon the sideband being transmitted. If the signal is not intelligible after tuning is completed as outlined below, set the RESPONSE control to the other sideband setting and repeat the tuning procedure.

After the controls have been properly set as outlined in the preceding paragraph, very carefully tune in the single-sideband signal for maximum intelligibility. It will be noticed that with incorrect tuning of a single-sideband signal, the speech will sound high or low pitched or very distorted but no trouble should be encountered in tuning once a little experience has been gained.

The "1 KC" position of the SELECTIVITY control permits reception of modulation frequencies up to about 1000 cycles. For reception of modulating frequencies higher than 1000 cycles, set the SELECTIVITY control to the positions marked "2 KC", "3 KC" and "5 KC", depending on the degree of fidelity desired; maximum fidelity is obtained in the "5 KC" position. The notch filter is especially useful during reception of single-sideband signals. An undesired AM or CW signal close in frequency to the desired signal will heterodyne with the beat oscillator to produce an audible beat. The undesired signal may be "notched out" with the notch filter, just as in AM or CW reception.

5-4. USE OF CRYSTAL CALIBRATOR.

The built-in 100 KC crystal calibrator permits accurate checking of dial calibration on the 80, 40, 20, 15 and 10 meter bands by a comparison of the dial calibrations with the marker signals which appear at every multiple of 100 KC on the dial. Crystal calibration points are not provided on the converter band as calibration on this band will largely be dependent on the particular converter in use. The 30.5 to 34.5 MC tuning range of this band can be checked if desired by externally connecting the CONVERTER input socket to the A1 antenna terminal on TS1 providing 100 KC crystal check points as on other bands. This jumper should be removed while operating with a converter as the additional "antenna" connected at this point would tend to decrease the signal to noise ratio.

A. CALIBRATION OF THE DIAL.

1. Set the tuning dial at a convenient multiple of 100 KC at the high frequency end of the band in use (or nearest any particular frequency within the band it is desired to tune). Examples of high frequency end check are: 4000 KC on 80 meters, 7300 KC on 40 meters, 14,400 KC on 20 meters, 21,500 KC on 15 meters, and 29,700 KC on 10 meters.

2. Set the RESPONSE control at SSB-CW "UPPER" or "LOWER" sideband, the PITCH control at "0", and the CALIB.-OFF switch at "CALIB.".

3. Very carefully adjust the tuning control for the exact 100 KC frequency mark as indicated by "zero beat". If the vertical pointer on the dial does not fall exactly on this 100 KC mark, adjust the POINTER RESET control until the pointer falls right on the mark. For example, on the 80 meter band, a "zero beat" should be obtained at 3500, 3600, 3700, 3800, 3900, and 4000 KC.

4. The procedure outlined in steps 1 through 3 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 dial is set at a multiple of 100 KC nearest the desired frequency or range of frequencies, instead of at the high end of the band as in step 1.

5-5. 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 the cathode circuit of the "S" meter tube (V15), the grid of which is controlled by AVC voltage. Since the cathode 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, and also in "S" units from 1 to 9, and in decibels above S9 to +80 DB. The indications on the "S" meter will be correct only when the RF GAIN control is set at or near "10" (maximum sensitivity), and the AVC switch is set at "ON". The AVC "FAST-SLOW" switch will effect the relative response time of the "S" meter as evidenced by slower meter action when the switch is in the "SLOW" position.

NOTE

The "S" meter will also indicate relative signal strength when the AVC switch is at OFF, and/or when the RF GAIN control is not fully clockwise.

The limitations of the microvolt scale should be fully understood before any assumption as to the indicated signal voltages is accepted. The meter indicates approximate microvolts of signal strength as developed at the antenna input terminals when terminated in a 50-70 ohm load, at 14.3 MC. The indicated microvolt readings at other frequencies may vary slightly from that at 14.3 MC.

5-6. BFO FREQUENCY CHECK.

The beat frequency oscillator (BFO) has been carefully adjusted at the factory so that its frequency is 50.0 KC when the PITCH control knob is set at "0". Readjustment of the BFO will normally not be required unless the 6SC7 BFO tube (1/2 of V8) or components in the BFO circuit have been replaced. A slight readjustment sometimes may be necessary occasionally as a result of normal aging of the BFO tube. A simple check can be made to determine if adjustment is necessary as follows:

With the SELECTIVITY control at "5 KC", RESPONSE control at SSB-CW "UPPER" sideband, and PITCH control at "0", very carefully tune in an AM signal for "zero beat". (See Note A below.) Leaving the receiver tuning unchanged, switch the RESPONSE control to the "LOWER" sideband position. If the beat oscillator frequency is correct, a "zero beat" will be obtained in both the "UPPER" and "LOWER" SSB-CW sideband positions. If, however, the beat oscillator is slightly off frequency, a beat note will be heard when switching from the "UPPER" to the "LOWER" SSB-CW sideband position. Adjustment of the beat frequency oscillator is necessary only if the frequency of the audible beat note exceeds 200 cycles.

NOTE A

In instances where the beat oscillator is considerably off frequency, it may not be possible to obtain a "zero beat" when tuning in the signal. In this case, it will be necessary to first "roughly" set the beat oscillator to operate at approximately 50 KC as follows: With the SELECTIVITY control at ".5 KC", and RESPONSE control at SSB-CW "UPPER" sideband, tune the receiver to a noisy part of the band (not to a signal). Remove the PITCH control knob and adjust the BFO slug for minimum noise on the noise signals. Then set the SELECTIVITY control at "5 KC" and make the BFO frequency check as outlined in the preceding paragraph.

If the BFO frequency check indicates adjustment is necessary, proceed as follows:

Remove the PITCH control knob and turn the BFO slug a few degrees to the left or right so as to lower the beat note frequency, and repeat the BFO frequency check. If the beat note obtained is higher in frequency than that obtained originally, it is an indication that the slug is being turned in the wrong direction. Continue varying the setting of the slug in small steps and repeating the BFO frequency check until "zero beat" is obtained in both the "UPPER" and "LOWER" SSB-CW sideband positions. After the correct slug setting is determined, replace the PITCH control knob with "0" in the top center position, being careful not to disturb the slug setting.

5-7. NOTCH FREQUENCY CHECK.

Readjustment of the notch filter circuit is not normally necessary unless the components in the notch filter circuit are replaced. To check the circuit, proceed as follows:

Check the BFO frequency as instructed in paragraph 5-6. Set the PITCH control at "0", AVC to "ON" and the SELECTIVITY control at "3 KC". Tune in an unmodulated carrier, from a station, a transmitter VFO, or a signal generator, for a "zero beat". Place the RESPONSE control in the AM "UPPER" or "LOWER" sideband position to deenergize the BFO. Rotate the NOTCH DEPTH control to "MAX". Tune the NOTCH FREQ. for a minimum reading on the "S" meter. The NOTCH FREQ. dial should be set at "50 KC".

If the notch frequency check indicates that an adjustment is necessary, proceed as follows:

Loosen the NOTCH FREQ. knob and reset it to indicate "50 KC". Rotate the control to approximately "51 KC". Tune across an unmodulated carrier while observing the "S" meter. (Use an approximate S9 signal.) The meter will indicate two peaks. Readjust the NOTCH FREQ. control as necessary to approximately equalize the peaks. Then tune the receiver for a minimum reading on the "S" meter between the two peaks. Adjust the NOTCH ADJ. control R19, located on bottom of the SX-101A receiver chassis, for a minimum reading on the "S" meter. Refer to Fig. 12 for the location of R19.

5-8. CRYSTAL CALIBRATOR CHECK.

The CRYSTAL ADJ. control on the calibrator chassis operates a trimmer capacitor connected across the 100 KC calibrating crystal. This trimmer capacitor permits slight adjustment of the calibrating crystal to exactly 100 KC comparison with the 10 MC signal transmitted by station WWV. This is done by setting the BAND SELECTOR to "WWV 10 MC" and tuning the receiver to the WWV 10 MC mark on the top scale of the slide rule dial. This capacitor has been set at the factory and should not require periodic readjustment unless extreme calibration accuracy is desired. If adjustment is required, proceed as follows.

Set the RESPONSE switch to AM "UPPER" or "LOWER" sideband, the CALIB. -OFF switch at "OFF", and all other front panel controls as for normal AM reception. Tune in the 10 MC WWV signal and wait for the period during which the signal from WWV is unmodulated. Then switch on the crystal calibrator by setting the CALIB. -OFF switch at CALIB. and adjust its frequency, by means of the CRYSTAL ADJ. control (C 301), until the crystal calibrator signal "zero beats" with the signal received from WWV. If the adjustment is attempted during periods that WWV is modulated, an erroneous zero beat may be obtained with the modulating frequency instead of the desired carrier frequency.

5-9. SERVICE OR OPERATING QUESTIONS.

For any further information regarding operation or servicing of your SX-101A receiver, contact your Hallicrafters dealer. The Hallicrafters Company maintains an extensive system of Authorized Service Centers where any required service will be performed promptly and efficiently at a nominal charge. All Hallicrafters Authorized Service Centers display the sign shown below.

For location of the one nearest you, consult your local dealer or telephone directory. Make no service shipments to the factory as The Hallicrafters Company will not accept the responsibility for unauthorized shipments.

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

SECTION VI
ALIGNMENT

This receiver has been carefully aligned at the factory by specially trained and experienced 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 component parts have been replaced in the RF or IF stages. Alignment should be made only by persons familiar with communications receivers and experienced in their alignment. Refer to Figs. 11 and 12 for location of all alignment adjustments.

6-1. EQUIPMENT REQUIRED.

1. Signal generator covering 50 KC to 30 MC.
2. Vacuum tube voltmeter (VTVM) or other high impedance DC voltmeter.
3. Output meter (or AC scale of VTVM). Connect output meter to appropriate speaker output terminals. If a VTVM is used, connect it to terminals "500" and "G" and terminate the output with a 500-ohm resistive dummy load.

6-2. INITIAL CONTROL SETTINGS.

BAND SELECTOR ..... As indicated in chart
AF and RF GAIN ..... 10 (maximum)
AVC and NOISE LIMITER ..... OFF
SELECTIVITY ..... As indicated in chart
RESPONSE ..... AM "UPPER" sideband
RECEIVE-STANDBY ..... RECEIVE
TUNING ..... Gang half meshed
NOTCH DEPTH ..... OFF
ANT. TRIMMER ..... Mid point
POINTER RESET ..... Mid point
CALIB. -OFF ..... OFF
PITCH CONTROL 0
NOTCH FREQ. ..... As indicated in chart

CAUTION NOTICE: ALL OSCILLATOR TRIMMER CAPACITORS ARE SOLDERED AFTER ADJUSTMENT, AND ANY READJUSTMENT REQUIRES THE REMOVAL OF THIS "FIXING" SOLDER. FOR RECALIBRATING ADJUST SLUGS ONLY.

6-3. ALIGNMENT PROCEDURE.

Step	Signal Generator Connections	Signal Generator Frequency	Band Selector Setting	Output Connections	Selectivity Setting	Remarks
			50.75 KC IF ALIGNMENT			
1	High side directly to alignment point "A" (terminal 1 of T2). See Fig. 12. Low side of chassis.	50.75 KC (unmod.)	80 M	VTVM DC probe to alignment point "B" (junction of R58, R57, and C80). See Fig. 12.	.5 KC	Remove 1st conv. oscillator tube V3 from its socket to prevent signal interference. Adjust top slug of T3, T4, T6 and T7 (50.75 KC IF's) for maximum indication, maintaining approx. 1 volt reading on VTVM.
			ALIGNMENT OF 1700 KC 2nd CONV. OSC. & 1650 KC IF's			
2	High side directly to alignment point "C" (pin 7 of V2). See Fig. 12. Low side to chassis.	1650 KC (mod)	80 M	Output meter across appropriate speaker terminals. (VTVM to alignment point "B" if it is desired to monitor detector voltage.)	5 KC	Replace V3 removed in step 1. Tune generator slowly thru 1650 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 1700 KC crystal oscillator may not be oscillating and it will be necessary to

ALIGNMENT OF 1700 KC 2nd CONV. OSC. & 1650 KC IF's (cont)

turn up the generator output and adjust the 1700 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 1650 KC IF's (top and bottom slugs of T1 and T2). 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 of slug of T5) for a 6 db reduction in level (as indicated on the output meter) on the gentle slope side of maximum response. Then set the generator as near the center of the IF 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 T2.

ALIGNMENT OF 1600 KC 2nd CONV. OSC.

Step	Signal Generator Connections	Signal Generator Frequency	Band Selector Setting	Output Connections	Selectivity Setting	Remarks
3	High side directly to alignment point "C" (pin 7 of V2). See Fig. 12. Low side to chassis.	1650 KC (mod)	80 M	Output meter across appropriate speaker terminals. (VTVM to alignment point "B" if it is desired to monitor detector voltage.)	5 KC	Set RESPONSE control at AM-"LOWER" sideband. Tune generator slowly through 1650 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 1600 KC crystal oscillator may not be oscillating and it will be necessary to turn up the generator output and adjust the 1600 KC crystal activity adjustment (top slug of T5) until output is obtained. Adjust for maximum output by adjusting the signal generator frequency and the crystal activity (top slug of T5). 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 (top slug of T5) to a point on the gentle slope side of maximum response that produces the same audio output as when the RESPONSE switch is set in the AM "UPPER" sideband position.

IF SENSITIVITY CHECK

4 With the generator modulated 30% at 400 cycles and connected thru a .05 mfd capacitor to the grid (pin 1) of the 1st mixer tube V2, the IF input required for 1/2 watt receiver output should be approximately 20 microvolts. This assumes the crystal activity has been adjusted as outlined in steps 2 and 3 above.

RF ALIGNMENT

Before proceeding with the RF alignment, check the tuning dial for proper indexing. The dial should index with the low frequency end of the bands when the tuning gang is fully closed.

Use an amplitude modulated (30%) signal.

Set RF GAIN and AF GAIN at "10", AVC and NOISE LIMITER at "OFF", SELECTIVITY at "2 KC", RESPONSE at AM "LOWER" sideband, and RECEIVE-STANDBY at "RECEIVE".

Connect the output meter across the appropriate speaker terminals. (Connect the VTVM to alignment point "B" if it is desired to monitor the detector voltage.) Maintain a 1/2 watt receiver output.

Connect high side of generator thru 50 to 70-ohm carbon resistor to antenna terminal "A1". Connect jumper between "A2" and "G".

The oscillator frequency is higher than the signal frequency on all bands.

Step	Band Selector Setting	Generator & Receiver Frequency	Adjust for Maximum
5	CONVERTER	34.5 MC	C55 (osc. trimmer) C19 (mixer trimmer) C37 (ant. trimmer at mid point)
	CONVERTER	30.5 MC	L13 (osc. trimmer) L6 (mixer slug) L1 (ant. slug)

RF ALIGNMENT (cont)			
Step	Band Selector Setting	Generator & Receiver Frequency	Adjust for Maximum
6	80 M (Band 2)	4.0 MC	C56 (osc. trimmer) C14 (mixer trimmer) C37 (ant. trimmer at mid point)
	80 M (Band 2)	3.5 MC	L14 (osc. slug) L7 (mixer slug) L2 (ant. slug)
7	40 M (Band 3)	7.3 MC	C57 (osc. trimmer) L8 (mixer slug) C37 (ant. trimmer at mid point)
	40 M (Band 3)	7.0 MC	L15 (osc. slug) C38 (mixer pad) L3 (ant. slug)
8	20 M (Band 4)	14.4 MC	C58 (osc. trimmer) L9 (mixer slug) C37 (ant. trimmer at mid point)
	20 M (Band 4)	14.0 MC	L16 (osc. slug) C39 (mixer pad) L4 (ant. slug)
9	10 M (Band 6)	30.0 MC	C61 (osc. trimmer) L10 (mixer slug) C37 (ant. trimmer at mid point)
	10 M (Band 6)	28.0 MC	L18 (osc. slug) C41 (mixer pad) L5 (ant. slug)
10	15 M (Band 5)	21.5 MC	C59 (osc. trimmer) C16 (mixer trimmer) C37 (ant. trimmer at mid point)
	15 M (Band 5)	21.0 MC	L17 (osc. slug) C40 (mixer pad) C3 (ant. pad)
11	10 MC WWV (Band 7)	10.0 MC	C53 (osc. trimmer) C17 (mixer trimmer) C4 (ant. pad)

BFO ADJUSTMENT
Refer to Section 5-6.

NOTCH FILTER ADJUSTMENT
Refer to Section 5-7.

"S" METER CALIBRATION
See Section 6-7.

Make both the mechanical and the electrical "S" meter zero adjustments.

Connect the signal generator as for RF ALIGNMENT above. Use a 14.3 MC, 50 UV modulated signal.

Set the receiver controls for AM reception on the 20 M band and accurately tune in the signal.

Set RF GAIN to "10" (maximum), AVC to "ON" and SELECTIVITY to "2 KC".

Adjust R26 for S9 reading on "S" meter.

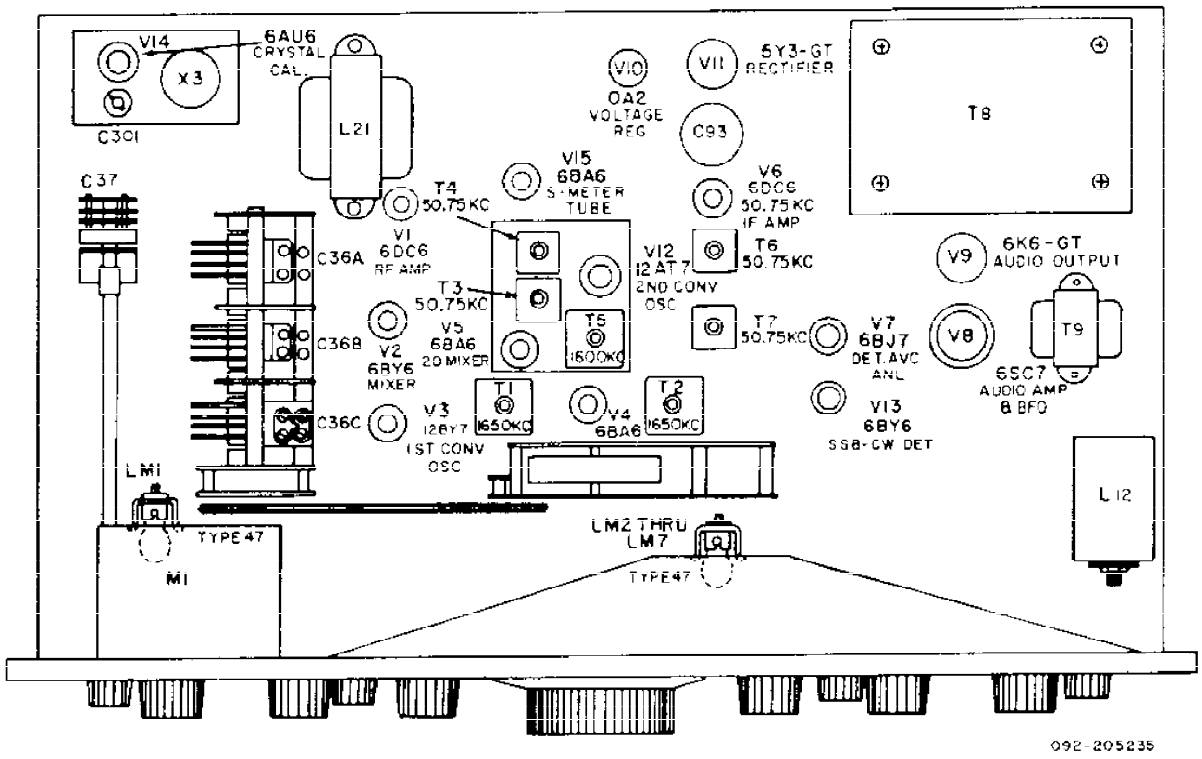

Figure 11. Top View of Receiver

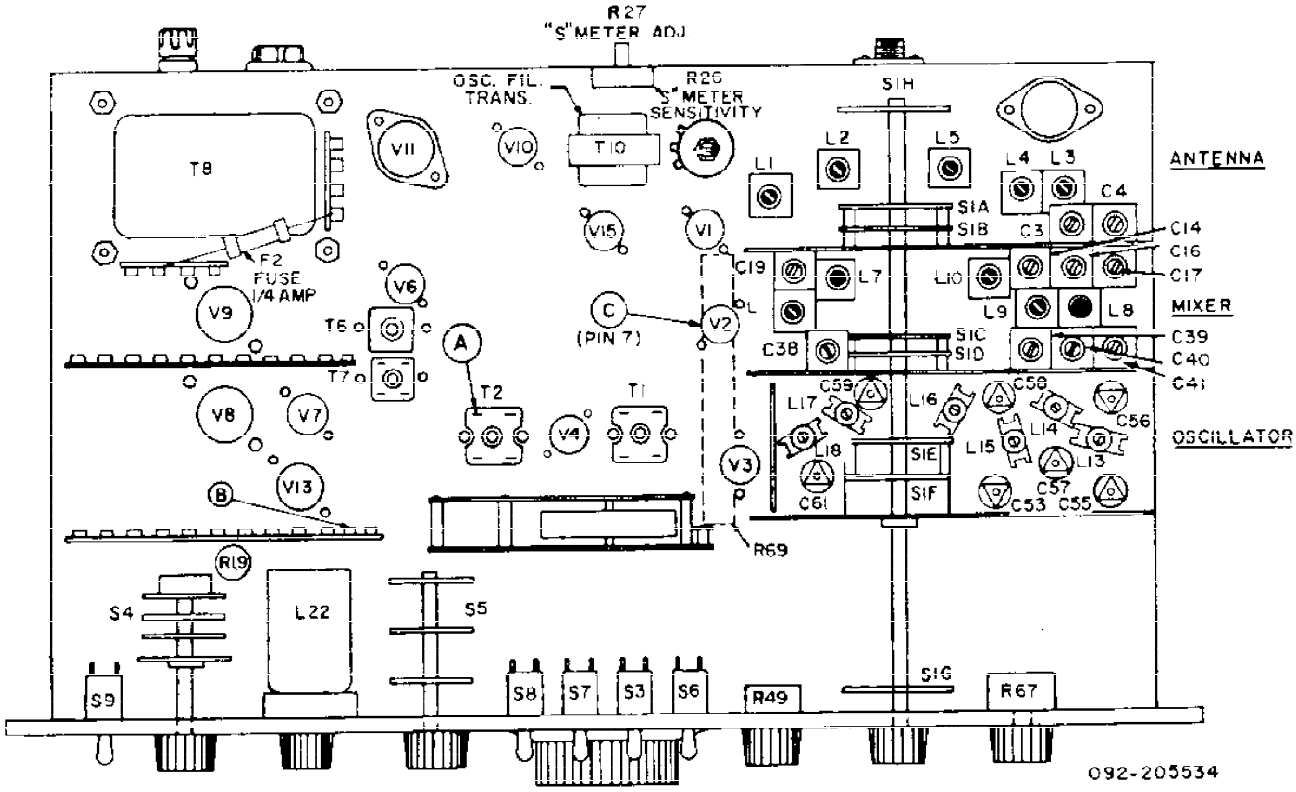

Figure 12. Bottom View of Receiver

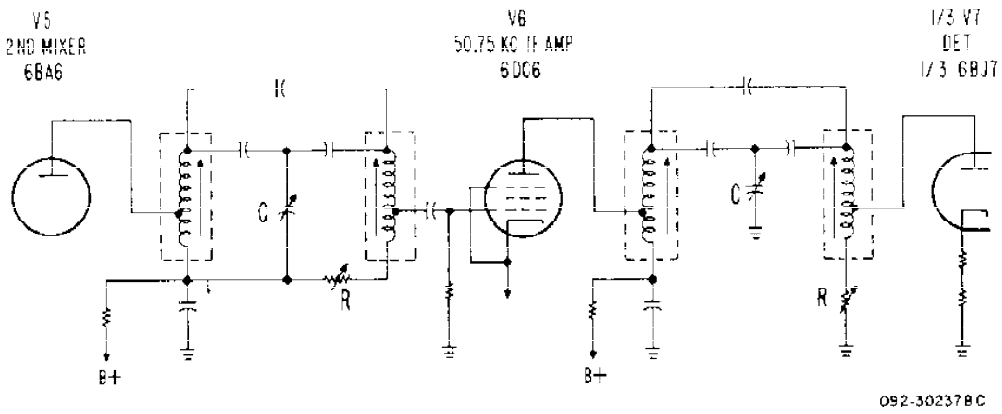

Figure 13. Equivalent Schematic Diagram of the 50.75 KC IF System

SECTION VII
SERVICE DATA

7-1. 50.75KC IF SYSTEM.

Fig. 13 shows the type of coupling used in the 50.75 KC IF system. Note that inductive coupling is avoided by careful shielding of the IF coils and signal transfer occurs only through capacitance and resistance. By increasing the value of "C" and decreasing "R", the selectivity is made sharper while by decreasing "C" and increasing "R", the selectivity is made broader. The proper values of "C" and "R" are switched in the circuit by means of the SELECTIVITY control. "R" varies the "Q" of the tuned circuit and "C" varies the coupling. This R-C coupling arrangement affords a more accurate means of selectivity control than that readily obtainable by any other method.

7-2. CHASSIS REMOVAL.

The chassis and front panel assembly are removable from the cabinet as a unit by removing two screws (top and bottom) at each side of the front panel and the three screws on the underside of the cabinet.

7-3. TUBE AND DIAL LAMP REPLACEMENT.

To gain access to the tubes and dial lamps, raise the hinged top cover of the cabinet. The tube locations and their functions are shown in Fig. 11.

7-4. "S" METER ADJUSTMENTS.

The mechanical adjustment of the "S" meter is accessible at the rear of the meter. The mechanical adjustment has been accurately set at the factory and will normally not require any further adjustment. Adjustment can be made, if required, by turning off the receiver and carefully rotating the adjustment screw until the meter pointer is in line with the right-hand index mark.

The electrical adjustment is made by carefully turning the "S" METER ADJ. control R27 on the rear of the receiver chassis (Fig. 12), until the pointer is in line with the left-hand index mark. The electrical adjustment should be made with the receiver on, antenna terminals shorted, RF GAIN at "10", RESPONSE switch at AM "UPPER" or "LOWER" sideband, AVC switch at "ON", and RECEIVE-STANDBY switch at "RECEIVE". The settings of the remaining controls do not affect the "S" meter reading.

7-5. DIAL CABLE RESTRINGING.

1. Remove the chassis from the cabinet (See paragraph 7-2).

2. Remove the knobs and front panel. This is done by removing four screws from the front panel and the locknuts from the five toggle switches and the phone jack.

3. Remove the dial panel assembly by removing two screws at each side of the chassis. Carefully lift the dial panel assembly upward and lay it on the chassis; take care not to damage the gears of IF cans and slugs.

4. Turn the tuning shaft fully counterclockwise so that the tuning gang capacitor is fully meshed.

5. Restring the dial cord as follows (Fig. 14):

   a. Attach the end of the cord to the tab (1) and pull the cord down and around the wheel. Proceed clockwise around the wheel (2 and 3) down behind wheel A (4).

   b. Continue up over wheel B (6) up to wheel C (7). Proceed across pointer rail to wheel D (10).

   c. Continue around wheel D to the left and over wheel E (9). Proceed down behind wheel F (10).

d. Finish up by routing the cord into the wheel slot (11) and attach the spring on the tab (12).

6. Set the POINTER RESET shaft at the halfway point of its travel.

7. Set the pointer on the pointer rail and engage the dial cord. Do not crimp the tabs on the pointer at this time.

8. Temporarily set the dial panel assembly in place to line up the pointer. The tuning shaft should be fully counterclockwise and the tuning gang capacitor fully meshed.

9. Line up the pointer on the left-hand frequency marks on the dial.

10. Remove the dial panel assembly and crimp the tabs on the pointer. Place a drop of cement on the pointer tabs and dial cord to permanently secure the pointer and dial cord.

11. Rotate the tuning shaft from the low end to the high end, and back to the low end. Do this several times. Check for backlash or jerky motion of the pointer. If this occurs, it may be necessary to shorten and tighten the dial cord, straighten the pointer, or both.

12. Replace the dial panel assembly, front panel, knobs, and return the chassis to the cabinet.

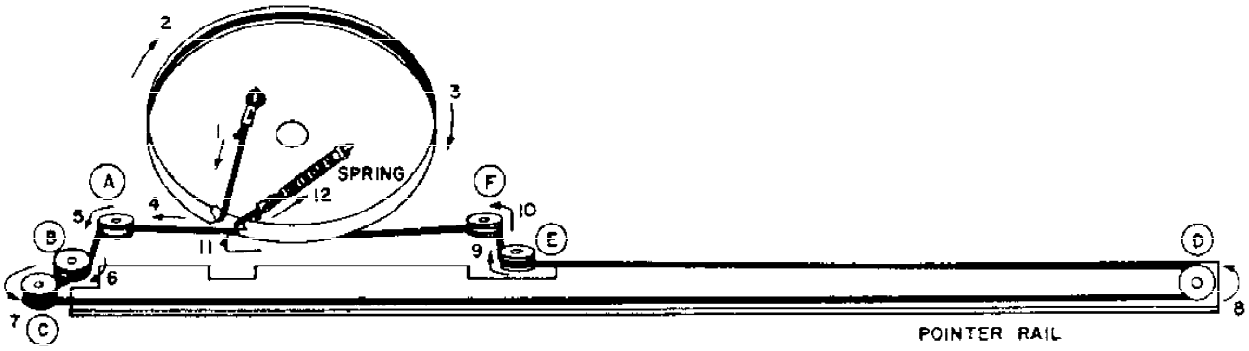

Figure 14. Dial Cord Stringing Diagram