

REVISIONS

APP.

C APPROVED 6-7-46

200

SP400SX
I.F. - AVC AND BFO ALIGNMENT

10. The crystal should now be turned to #1 position and upper inductor (L27) in crystal assembly should be rechecked for max. amplitude. Turn crystal to #2 position and recheck trimmer capacitor (C35) for symmetry.

AVC

Change AVC - MAN Sw. to AVC and turn sensitivity control to max. sensitivity. Adjust capacitor (C51) in A.V.C. amplifier assembly can for minimum width of trace.

BFO

Change A.V.O. - MAN. Sw. to MAN. Turn crystal selectivity #5 position and Signal Sw. to C.W. position. Either visual or audible method may be used.

VISUAL METHOD

Adjust trace to suitable size by adjusting Sens. control. Turn Beat Osc. control on front panel to zero and with audio gain at suitable level adjust capacitor C47 on B.P.O. can assembly for zero beat which will appear as horizontal lines on scope. A further check for zero beat is made by observing trace on scope when front panel B.P.O. control is turned an equal distance on each side of zero. The amplitude of the trace on both sides should be equal.

AUDIBLE METHOD

Using headphones or speaker turn Beat Osc. control on front panel to zero. Adjust C47 on B.P.O. can assembly for zero beat. A further check for zero beat is made by observing whether tone pitch is the same when Beat Osc. control on front panel is turned an equal distance each side of zero.

If either of the above adjustments are made and zero beat does not occur at zero on scale a check should be made to see that flat on shaft and pointer are correctly aligned and that rotor plates are half meshed between upper and lower stator plates.

TOLERANCES
FACTORS:
UNLESS OTHERWISE
SPECIFIED

FINISH
HAMMARLUND
NEW YORK

DESIGNED BY
CHECKED BY
APPROVED BY

DESCRIPTION

ALL DIMENSIONS IN INCHES
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No. 19019

R.F. ALIGNMENT FOR SP400SX

1. Connect output of Hammarlund frequency modulated signal generator, model E or equivalent, to antenna terminals.
2. Connect speaker leads to terminals marked speaker on rear of set.
3. Connect high side of scope lead (vertical input) to left terminal (front view) of phone input strip located at rear of chassis. Connect ground side of scope to chassis.
4. Check dressing of wiring.
5. Preset trimmer condensers on 1st and 2nd R.F. and 1st Det. on all bands excepting 20 to 40 Mc by unscrewing trimmer screws approximately 2 turns. On 20-40 Mc band adjust trimmer approx. 1/2 turn.
6. Set receiver controls as follows:

Audio - any setting	A.V.C. - man.
Sens. - approx. 7	Limiter off
Phasing - arrow	Crystal #1
Send Receive Sw. - receive	Signal - mod.
Band Spread Dial - 100	Band Width - 3
7. Turn receiver on.
8. Set band switch at 1250-2500 Kc Generator at 2.5 Mc. Main tuning dial at 2500 Kc. The signal generator gain control should be kept as low as good operating conditions will permit. This is to keep the receiver from overloading. The sensitivity control on the receiver can be varied but should be kept fairly high. The order of tuning should be as follows; Oscillator, first detector, second R.F., and then first R.F.
9. Turn osc. band #1 trimmer until two traces appear on scope, then bring them together until they coincide.
10. Adjust 1st det., 2nd R.F. and 1st R.F. trimmers for maximum amplitude of trace.
11. Set signal generator at 126 Mc and main dial at 1260 Kc. Adjust inductor slug until the two traces coincide. Adjust inductor slugs of 1st det., 2nd R.F. and 1st R.F. for maximum amplitude. Next reset signal generator at 2.5 Mc and main dial at 2500 Kc. If the two traces do not now coincide adjust oscillator trimmer until they do. The 1st det., 2nd R.F. and 1st R.F. trimmers should now be rechecked for maximum amplitude. This operation may have to be repeated at the high and low ends until traces coincide and maximum amplitude is obtained.

REVISIONS		RPT
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TOLERANCES FRACTIONS UNLESS OTHERWISE SPECIFIED DECIMALS:		
TITLE R.F. ALIGNMENT FOR SP400SX		
MATERIAL FINISH HAMMARLUND NEW YORK		
PART NO. 100		
DESCRIPTION PART KIT FOR		
NET WT 1.0		
APPROVED 1/2		

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No. 100014

SP400SX FINAL TEST PROCEDURE

R.F. Sensitivity and Image Response

a. R.F. Sensitivity

Connect a 100 ohm carbon resistor in series with the signal generator to the antenna terminals of the receiver.

Set receiver controls as follows:

Audio - max. A.V.C. - max. Sens. approx. 3
Limiter - off Crystal + off Band Spread - 100
Bandwidth - 3 Signal - Mod.

Adjust receiver main dial to first frequency indicated on data sheet, and adjust signal generator to the same frequency, setting its dial for maximum output from the receiver.

Adjust attenuator for a reading of 500 mw on the output meter. Turn generator modulation switch to "off" and adjust sensitivity control for a reading of 50 mw on the meter. Turn modulation switch back to 400 cycles and re-adjust attenuator to produce 500 mw. It may be necessary to repeat this last step two or three times to obtain the desired 10:1 signal plus noise to noise ratio.

When the correct condition is obtained record the generator output voltage under "Sens. uv." next to the first frequency on the data sheet.

The above procedure is repeated for all frequencies.

b. Image Response

The procedure for image testing is similar to the procedure covering r.f. sensitivity, but the signal generator is tuned to the image frequency. The control settings are the same as above.

The image test should be made immediately after the sensitivity is measured on each frequency. When checking image response, do not alter the setting of receiver controls from that made during the sensitivity test.

To obtain output from the receiver on the image frequency, considerable signal generator output will be required, and the generator is tuned approximately 930 Kc from the receiver dial setting. The signal generator is set either higher or lower in frequency by the above amount depending upon the frequency band as follows:

REVISIONS		APP.
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TOLERANCES		FR. NO.
DIMENSIONS		
ENGINEERING DEPARTMENT		MFG.
FACTORY		
FINISH		DESCRIPTION
HAMMARLUND		
MATERIAL		QTY.
SP400SX Final Test Procedure		
CHECKED /		L.M.
APPROVED		

SHIPPED BY CONDON S.M.C.

No 19020

SPH005X_FINAL TEST PROCEDURE - cont'd.

Band	Signal Generator Frequency
1	330 KC higher
2	930 KC higher
3	930 KC higher
4	930 KC higher
5	930 KC lower

Tune signal generator dial for maximum receiver output, and adjust attenuator for 500 mw output reading.

Record generator output voltage under "Image uV" for the particular frequency on the data sheet.

C.W. Operation

Set receiver controls as follows:

Limiter - off	Crystal - off	Main Dial - 4.0 mc.
A.V.C. - max.	Band Spread - 100	Audic - max.
Seat Cos. - 0	Bandwidth - 3	Signal - Mod.

With the signal generator set to 4.0 mc, feed a 400 cycle 30% modulated signal into the receiver. Adjust signal generator output to 50 uV.

Adjust generator dial for maximum receiver output. Set sensitivity control for 50 mw reading on the output meter.

Turn generator modulation switch to "off" and set receiver on "CW". Adjust main dial for maximum output. The output meter should indicate approximately 500 mw.

If satisfactory check data sheet under "C.W. Operation."

A.V.C. Operation

Set receiver controls as follows:

A.V.C. - on	Main Dial - 4.0 mc.	Sens. - max.
Limiter - off	Band Spread - 100	Crystal - off
Bandwidth - 3	Signal - Mod.	

Set signal generator to 4.0 mc and adjust attenuator for output of 10 uV. Tune generator for maximum receiver output.

Adjust audic control for 0 DB output. Increase signal input to 100,000 uV. Record reading of output meter in DB on test data sheet.

The maximum increase in output should be approximately 12 DB.

REVISIONS		APP.
0	approved 6-7-46	40
TOLERANCES UNLESS OTHERWISE SPECIFIED		
DETAILS		
FINISH		
MATERIAL		
TITLE		
SPH005X_FINAL TEST PROCEDURE		
DESCRIPTION		
PART		
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FIRST HAND FOR		
REWORK		
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REVISIONS

APP

0 APPROVED 6-7-48

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SP400SX FINAL TEST PROCEDURES - cont'd.

Max. Undistorted Output

Set receiver controls as follows:

Limiter - off Crystal - off Main Dial - 4.0 mc,
 A.V.C. - on Band Spread - 100 Sens. - max,
 Bandwidth - 3 Signal - Mod.

Set output meter multiplier to $\times 30$ DB the meter is now calibrated for 50 watts full scale reading.

Feed a 5000 uV 30% modulated signal into the receiver. Tune signal generator to 4.0 mc and adjust its dial for maximum output from the receiver.

Connect vertical input of oscilloscope across output meter terminals.

Increase audio volume control until the waveform just begins to distort.

Read output meter and record power output on data sheet.

The output must be a minimum of 5 watts.

Phone Jack

Plug a pair of head phones into phone jack while testing for max. undistorted output.

Push phone plug into jack a few times to assure that jack makes good contact and does not short circuit.

Check data sheet.

S-Meter

Set receiver controls as follows:

Limiter - off Sens. - max. Main Dial - 4.0 MC
 A.V.C. - on Crystal - off Band Spread - 100
 Bandwidth - 3 Signal - Mod.

Feed a 50 uV signal into the receiver and tune generator dial for maximum indication on the S-Meter.

Adjust meter control potentiometer for a reading of 5-9.

Check data sheet.

Receiver Operation

Set receiver controls as follows:

TOLEANCES
 FINISHES
 ORIGINALS
 UNLESS OTHERWISE
 SPECIFIED

TITLE
 SP400SX Final Test Procedures
 MATERIAL
 FINISH
 HAMMARLUND
 NEW YORK

DATE
 2/16/51
 BY
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PT. NO. QTY. DESCRIPTION MAT. PR.

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