RECEPTION SET. R.107

Alignment Procedure and Performance Testing

1. I.F. Alignment

Connect an S.S.G., set up at 465 Kc/s. mod. 30% at 400 c/s, to the grid of the frequency changer (V1B), through a 0.1 uF. condenser, the valve grid connection being left in place. Tune the set to 3 Mc/s on range 3, switch to "Narrow" bandwidth, switch off the A.V.C., and peak all I.F. trimmers for max. output. A 150 ohm output meter connected across one half of the 600 ohm line winding may be used if a 600 ohm output meter is not available.

Switch on the A.V.C., and check the input required to give 50 mW output with the loudspeaker switched off. Check also the input required to the I.F. valve grids. They should not exceed the values given in the table.

2nd I.F.	1st I.F.	F.C.
30 mV.	1.5 mV	50 uV

The input at 400 c/s. to the grid of the 1st or 2nd A.F. stage should not exceed the following:

Output mW.	2nd A.F.	1st A.F.
50	3 volts	0.5 volts
200	6.3 volts	-

Reconnect the S.S.G. to the frequency changer grid and apply an input of 100 uV. Adjust the audio gain control to give 50 mW output. Decrease the S.S.G. frequency by approximately 10 Kc/s. and increase S.S.G. output by 6dB (i.e. to 200 uV). Gradually increase S.S.G. frequency towards 465 Kc/s. until 50 mW. is again recorded on output meter. Measure the change in frequency and repeat the procedure on the other side of resonance, to obtain the total bandwidth. Repeat with a 60dB. increase in input, and also the whole procedure with the bandwidth switch at "wide". The bandwidths should agree with those given in the table.

Input Increase	Bandwidth Switch	Bandwidth Kc/s
6dB	Narrow	2.5 to 3.25
60dB	Narrow	12.6 max.
6dB	Wide	6 to 8
60dB	Wide	18 max.

2. B.F.O. Alignment

Retune the S.S.G. to 465 Kc/s, switch S.S.G. and receiver to C.W., set the C.W. control to its central position, and adjust the B.F.O. trimmer for zero beat in the receiver phones.

3. Adjustment of Tuning Drive

If the drive has been disturbed, it should be reset as follows:-

(a) Immediately behind the panel are two pillars with screws and lock nuts. These screws should be screwed in towards the chassis.

(b) Set the condenser vanes at max. (i.e. edge of moving vanes in line with edge of fixed vanes) and adjust the right hand stop screw to meet the striker on the drive shaft.

(c) Set the cursor to 180°, ensure that it is parallel to the calibration marks, and secure it to the drive shaft with the clamping screw.

(d) Set the left-hand stop screw so that the pointer just reaches 0° on the scale.

(e) Tighten the lock-nuts on the stops and check the adjustments.

4. Calibration and R.F. Alignment

(a) Switch to range 3, set the bandwidth switch to "narrow", and connect the S.S.G. to the left-hand dipole terminal through a 100 ohm resistance. Earth the right-hand dipole terminal and set the aerial trimmer at "5". Set the receiver dial to 2.7 Mc/s, set up the S.S.G. at 2.7 Mc/s and adjust the oscillator trimmer C.3.L, and the R.F. trimmers C.3.I, C.3.F and C.3.C. for max. output.

(b) Set the S.S.G. and receiver dial to 1.3 Mc/s, and adjust the inductance of the oscillator coil L.9.A., and the R.F. coils L.6.B., L.6.A., and L.3.A., for max. output.

(c) Repeat on ranges 2 and 1, adjusting trimmers and coils as shown in the table.

Range	Frequency Mc/s.	Adjust Osc.	F.C. Grid	R.F. Anode	Aerial
3	1.3	L.9.A.	L.6.B.	L.6.A.	L.3.A.
3	2.7	C.3.L.	C.3.I.	C.3.F.	C.3.C.
2	3.0	L.8.A.	L.5.B.	L.5.A.	L.2.A.
2	7.0	C.3.K.	C.3.H.	C.3.E.	C.3.B.
1	7.5	L.7.A.	L.4.B.	L.4.A.	L.1.A.
1	17.0	C.3.J.	C.3.G.	C.3.D.	C.3.A.

The adjustments on each range should be done alternately until the calibration and sensitivity cannot be improved. Calibration Tolerance:-
Range 1. - 50 Kc/s; Range 2. - 25 Kc/s; Range 3. - 10 Kc/s.

N.B. If any inductance trimmer needs to be screwed right in, the coil should be examined, and if necessary, have its turns spaced out slightly, or be replaced, otherwise, the brass disc in the centre of the coil will reduce the efficiency.

5. R.F. Sensitivity and Signal/Noise Ratio

With the S.S.G. connected as above and with A.V.C. on, adjust the S.S.G. input until the Signal to Noise ratio (i.e. the ratio of output with and without S.S.G. modulation) is 20dB. The S.S.G. input should not exceed the figures given in the table.

Range	1			2				3	
Frequency Mc/s.	17,	11,	7,	7,	4.5,	2.9,	2.9,	1.8	1.2,
Input uV.	3.5	4.5	4.5	4.0	5.0	5.0	3.5	4.0	4.5

Switch off the S.S.G. modulation, switch the receiver to C.W., and adjust the heterodyne note to approximately 1000 c/s. The Signal to Noise ratio is the ratio between the output with and without the B.F.O. For a 20dB. ratio, the S.S.G. input should not exceed the figures given in the table.

Range	1	2	3
Frequency Mc/s.	7.0	2.9	1.2
Input uV.	2.3	2.0	1.5

Switch on the S.S.G. modulation, switch the receiver to R.T. and check the input required at 7 Mc/s. on range 1, to give 200 mW. output. It should not exceed 100 uV. Set up the S.S.G. and receiver on R/T. at any frequency. Adjust the S.S.G. input to give an output of 1 mW. from the receiver. On switching off the S.S.G. modulation, the output should fall by at least 20dB.

6. Second Channel Selectivity

Adjust the S.S.G. input to give an output of 50 mW., at a frequency of 17 Mc/s. Retune the S.S.G. to the second channel frequency and increase the S.S.G. input until the receiver output is again 50 mW. The increase in S.S.G. input should exceed the figure given in the table. Repeat at the other frequencies given.

Range	Frequency Mc/s.	Increase
1	17.0	Not less than 40dB.
2	7.0	" " " 60dB.
3	2.9	" " " 60dB.

7. Heterodyne Efficiency and Limiter Action

Adjust the S.S.G. and receiver to any frequency, and adjust the S.S.G. input to give an output of 10 mW. with the receiver gain controls at max. On switching to C.W., the output should be not less than 70 mW. when the heterodyne note is approximately 1,000 c/s. On switching on the crash limiter, the 10 mW. output should be reduced to between 0.5 and 2.0 mW.

8. A.V.C. Action

Apply an input of 10 uV. from the S.S.G. as for sensitivity, and adjust the A.F. gain control to give 1 mW. output. On increasing the input to 1000,000 uV., the output should not exceed 25 mW., and the receiver should not be unstable at any input between these limits.

9. Accoustic Response with the Audio Filter in circuit

Connect a B.F.O. to the grid of the 1st A.F. valve, switch on the audio filter and find the frequency at which the output is greatest. This is referred to as the peak frequency of the filter. Then adjust the B.F.O. output to give a receiver output of 50 mW. and measure the frequencies above and below the peak frequency which give 6 and 16dB. drop in output. These should be as follows.

A.	Frequency above peak giving 6dB drop in output.	910 to 1155 c/s.
B.	" below " " " " " "	640 to 880 c/s.
C.	" above " " 16dB " " "	None Specified
D.	" below " " " " " "	None Specified
A-B.		200 to 350 c/s.
C-A.		Not greater than 250 c/s.
B-D.		Not greater than 125 c/s.
Audio Filter Insertion Loss.		Not greater than 3dB.

10. Power Consumption

D.C.	3.25 amps. at 11.5 volts.
A.C.	50 volt-amps.

11. Check that the receiver performs satisfactorily on D.C.