

RADIO (1936) LIMITED—AUCKLAND

Alignment Hints

BANDSPREAD RADIOS

1941 7 VALVE and 9 VALVE MODELS

FOREWORD:

As the Bandspread system of tuning short waves is employed in the above models, some modification of the standard alignment procedure is required.

The following hints are intended as a guide for the serviceman should realignment at any time become necessary.

We must emphasize, however, that all receivers are very carefully aligned in the factory by means of crystal controlled oscillators and no attempt should be made to alter these original settings unless there is very good reason for so doing.

Frequency drift has been reduced to a very low minimum by the use of superior components.

INTERMEDIATE FREQUENCY:

This should be adjusted in the conventional manner to exactly 460 kilocycles.

BROADCAST R.F. ALIGNMENT:

There is nothing unusual in this. The diagram shows the position of the oscillator, modulator, and R.F. trimmers. The oscillator trimmer is for setting the frequency around 1400 to 1500 k.c. and the other two should be brought in line for maximum response. The B.C. paddler corrects the frequency around 600 k.c.

HOW SHORT WAVE BANDSPREAD IS OBTAINED:

Here we are concerned only with the International 16, 19, 25, and 31 metre bands.

For each one of these four S.W. bands there are separate oscillator, modulator and R.F. trimmers. These are shown in the diagram, grouped in banks of four, all the oscillator, all the modulator, and all the R.F. trimmers being grouped together. It will be noticed that the four S.W. oscillator trimmers are of special construction designed to prevent frequency drift. These are adjustable by means of a small screwdriver which should be inserted in the slots in the metal portion of the trimmers. There is only one set of three short wave coils, these being connected in turn to either the 16, 19, 25 or 31 metre trimmers by means of the waveband switch. This one set of coils in conjunction with the respective trimmers (as selected by the switch) provides the main tank circuits.

The main variable tuning condenser is connected to these various tank circuits by means of a condenser network so that a complete rotation of the main gang produces only a slight change in the tank circuit frequency in such

a manner as to sweep across only the 16, 19, 25 or 31 metre bands and a certain amount of territory to either side. In this manner the station settings are expanded out and bandspreading is effected.

Note:

It should be noticed that the condenser network above referred to consists of small anti-drift capacitors of special silvered ceramic construction. These somewhat resemble resistors in appearance. Details will be given in the main circuit diagram.

FACTORY ADJUSTMENT OF SHORTWAVE CIRCUITS

In the factory set-up specially constructed crystal controlled oscillators are used for Bandspread shortwave adjustment. These oscillators provide simultaneously four signals all modulated with different audio frequencies. These four signals have Radio Frequencies of 17750, 15250, 11800 and 9600 kilocycles which correspond to central positions in the 16, 19, 25 and 31 metre bands respectively.

As most servicemen will not have equipment of this nature there might be some difficulty in making adjustments to the short wave side with their standard test equipment.

Where suitable apparatus is unobtainable, it is highly desirable that the short wave side be lined by direct listening to short wave stations rather than by means of any test equipment. This requires no more apparatus than a small insulated screwdriver and is very simply done if the method here described is carefully followed.

OSCILLATOR/SIGNAL FREQUENCY RATIO

It is important to note here that both these 7-valve and 9-valve bandspread receivers (as well as the junior 5-valve Dual Wave receiver) operate on short waves with the signal frequency higher than the oscillator frequency. That is to say if the signal frequency is 11800 k.c. the oscillator should be running on $11800 \div 460 = 11340$ k.c.

SUGGESTED METHOD FOR SHORT WAVE ALIGNMENT

Connect the set to an aerial, preferably a fairly long one for adjustment purposes.

Turn the waveband switch to the band it is desired to adjust, for the present example, say the 25 metre band.

Consider only the three trimmers, the 25M oscillator, the 25M modulator, and the 25M R.F.

PRELIMINARY SHORT WAVE ADJUSTMENT:

Leaving the oscillator trimmer at its original position, adjust the other two trimmers till **static noises and any weak interference** peak to a maximum. It is very important in this preliminary adjustment to neglect all sharp signals such as stations or morse, etc. There will be two positions of both the modulator and R.F. trimmers where this interference and noise should peak, one position with more and one with less capacity in the two trimmers. Select the position of least capacity (screwed out). Here the interference should be stronger than in the higher capacity position. These two points where the interference peaks generally are slightly sharper on the modulator than on the R.F. trimmer, so adjust the modulator trimmer particularly carefully and slowly. Having carefully located these two points and carefully chosen the lower capacity one the waveband is ready for the final adjustment.

FINAL ADJUSTMENT

Now set the pointer about the middle of the dial. Very slowly increase or decrease the capacity of all three 25 metre trimmers **together**, making only **very slight** changes at a time till 25M stations are heard. These can then in this manner be brought to their correct dial settings.

This process is very similar to that used when stations near the H.F. end of the B.C. band are being put on frequency. The oscillator trimmer controls the settings and the other two trimmers are lined to it. Therefore move the oscillator trimmer first and step by step go up or down till the stations are brought on frequency.

POINTS TO LOOK FOR

In making the "Final Adjustment" to the three trimmers when searching for stations, it is very important to **make only very slight changes at a time**, otherwise the "Preliminary Adjustment" when the modulator and R.F. trimmers were set at the lower capacity peaking positions might become crossed over. Any waveband could still be lined and good results obtained in this latter condition, but the megacycle readings would be incorrect and the performance generally poorer than when the adjustment is correctly done.

It should be noted that the two peaking points on the modulator and R.F. trimmers are close together with the 16M band and progressively further apart till with the 31M band, both trimmers require to be screwed almost right down to locate the unwanted low frequency peaking position.

Unless the set has been damaged or the trimmers tampered with, it is most unlikely that any more than a minor application of the above "Final Adjustment" will be required and this only if found to be absolutely necessary. Therefore do not alter the original oscillator trimmer settings if avoidable.

In making the "Preliminary Adjustment", noise or static is chosen in order to obtain some signal covering the entire waveband. There might be occasions when there is little actual interference available on certain bands even with the volume control full on. Generally the slight hiss or breathing sound from the speaker is sufficiently audible to enable the adjustment to be made, but if the locality is not quiet enough for this to be audible, a buzzer, vacuum cleaner motor or other similar source of interference, if sufficiently attenuated, will answer the purpose.

CIRCUIT DIAGRAMS

The main circuit diagram should be consulted in connection with any normal servicing.

The particulars given herewith are intended only as a guide to short wave adjustment.

IMPORTANT:

It will be noticed in the pictorial diagram of the underneath side of receiver that the short wave oscillator trimmers are shown in different positions. This does not indicate the actual position of the moving plate for the correct adjustment but is intended to illustrate the rotation of the trimmer from minimum to maximum capacity.

The 31 metre trimmer is shown in the maximum capacity position, the 16 metre trimmer is shown in the minimum capacity position, and the 19 and 25 metre trimmers are shown in such a position that the capacity is approximately half of maximum.

