



SERVICE BULLETIN

No. 72

First Edition—OCTOBER, 1940

STANDARD LINE-UP PROCEDURE FOR
MULTI-BAND RECEIVERS.

R.N.Z.
RADIO CORPORATION OF NEW ZEALAND LTD.

80 Courtenay Place, Wellington, C.3., New Zealand.

STANDARD LINE-UP PROCEDURE FOR MULTI-BAND RECEIVERS.

The alignment of a modern multi-band receiver is an operation of the utmost importance. Upon this process depends the efficiency of the receiver as a means of picking up distant stations, and it is imperative that this operation be not attempted without the necessary equipment. This entails the use of a ~~standard~~ signal generator capable of providing all test frequencies at suitable output levels, modulated approximately 30 per cent, with an audio tone of about 400 cycles per second. The signal generator should also be provided with the requisite all-wave dummy antenna. For a really accurate line-up, together with a measure of the sensitivity, a good output meter is also essential.

The following remarks may be applied to any type of receiver, regardless of the number of wavebands for which it is designed. However, in the case of receivers, such as Model 75, in which each international short-wave broadcast band is expanded to the full length of the dial scale, the special instructions for aligning the short-wave bands, given in the Service Bulletin for the model, should be followed.

1. INTERMEDIATE FREQUENCY ALIGNMENT:

In the case of most models the I.F. channel is aligned at the factory with a frequency-modulated oscillator and oscilloscope to produce a flattop resonance curve. The I.F. transformers are designed to pass as wide a band as possible consistent with a high degree of adjacent channel selectivity and, because of this, the alignment will not be exactly correct if only the normal signal generator is used. Consequently, no attempt to re-align the I.F. transformers should be made unless the I.F. sensitivity is found to be below normal. In this case the following procedure should be adopted.

Set signal generator at the prescribed intermediate frequency for the receiver under test and connect the receiver's earth lead to the earth on the signal generator. Connect the "hot" lead from the signal generator to the grid of the converter valve leaving the normal grid clip in position. The lead from the signal generator should not provide a D.C. path to chassis, as this may remove the bias from the valve. A condenser in series with this lead is provided in the R.N.Z. All-Wave Dummy Antenna for this reason.

Set the band-change switch to the broadcast band position and tune the receiver to about 700 k.c. Connect the output meter across the primary of the speaker transformer, turn volume control to maximum and tone control to the high position. Increase output from signal generator until the signal is heard and then adjust the trimmer screws in each I.F. transformer in turn, for maximum output. An approximate idea of the shape of the resonance curve may be obtained by swinging the signal generator dial across the correct setting for the intermediate frequency and noting the change in output. It will generally be found that, by screwing out the primary (plate) adjusting screw in the first I.F. transformer (only) a fraction of a turn until the output voltage drops 10 to 20 per cent., the correct flat-top, or slightly double-bumped resonance curve will be obtained.

The table of sensitivity figures shown in the Service Bulletin for the model under test indicates the microvolts input necessary to give standard output of 50 milliwatts which is equivalent to 16 volts across a 5000 ohm load. If there is no fault in the receiver, sensitivity figures approximating those shown in the table should be obtained.

2. BROADCAST BAND ALIGNMENT:

Connect aerial and earth leads to signal generator through standard all-wave dummy antenna. Set dial pointer so that it is directly behind (or in front of) centre of line marking end of scale when gang condenser plates are fully meshed. The location of trimmers is shown in the Service Bulletin for each model. Set signal generator frequency at 1,400 kc. and tune receiver to 1,400 kc. on dial scale. Tune-in signal by adjusting broadcast

oscillator trimmer and then adjust B/C aerial and R.F. trimmers for maximum output. The output from the signal generator should always be reduced to the lowest value consistent with satisfactory output meter readings.

Set signal generator at 600 k.c. and tune-in signal. Rock gang condenser and adjust B/C padder for maximum output. If the padder setting is found to need appreciable alteration it will be necessary to repeat the previous adjustments at 1400 k.c. Calibration may then be checked by noting the position of B/C stations on the dial or by utilising the 100 kc. output from the Frequency Standard SF1

3. SHORTWAVE BAND ALIGNMENT:

The short-wave band in most models covers either 6,000 kc. to 18,000 kc. or 6,000 kc. to 15,500 kc. where there are two short-wave bands, as in some earlier models, the additional band may cover a range either higher or lower than this, but the same general provisions will apply.

In the case of models in which the short-wave bands are expanded the special instructions in the Service Bulletin for the particular model should be followed.

Set the signal generator at the high frequency line-up point for the model under test. This will be given in the Service Bulletin and will be at a frequency near the high frequency end of the short-wave range. Set the receiver dial at this frequency and tune-in the signal by adjusting the S/W oscillator trimmer. It will be found that the signal can be tuned at two points in the trimmer adjustment. The correct adjustment is that with the trimmer screwed farthest out. Now adjust the S/W R.F. and aerial trimmers for maximum output. If two peaks are noticed in making this adjustment, the correct setting is that where these trimmers are screwed farthest in. If these adjustments are not made correctly and the receiver is aligned "on the image" tracking and calibration will be poor and sensitivity will be low at some point in the range. To ensure that this is not the case the position on the dial where the image is received should be checked. With an intermediate frequency of 455 k.c. the image of a 15,000 kc. signal will be tuned at 14,090 kc. on the dial, or roughly one megacycle lower in frequency, if the alignment has been done correctly.

Of course, the output from the signal generator must be increased when checking the position of the image.

Where the receiver is provided with a variable S/W padder, the padder adjustment should be made near the low frequency end of the range, generally at 6,000 kc. The gang condenser must be rocked as the padder is adjusted for maximum output. If appreciable alteration is necessary to the padder setting, it will be necessary to repeat the trimmer adjustments at the high frequency line-up point.

Where no variable S/W padder is provided, the only adjustment necessary is the setting of the trimmers at the line-up point specified and, provided the gang condenser has not been damaged, the tracking and calibration over the rest of the scale will be correct.

Calibration and sensitivity should be checked at 15,000, 12,000, 9,500, and 6,000 kc. and, if desired, the 1,000 kc. output from the Frequency Standard SF1 may be utilised to provide calibration points at each megacycle throughout the short-wave range.

Please Note:

For Line-up Procedure of Calibrated Short-Wave Models the special instructions in the Service Bulletin for the particular model should be followed.

In case of models 3 years old or more, reference should be made to Service Bulletin No. 12, published in April, 1936. These Bulletins are obtainable on application to the Engineering Department.