



RADIO CORPORATION OF NEW ZEALAND LTD

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S40/1

SERVICE SUPPLEMENT.

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MODEL 75 - 7 VALVE RECEIVER WITH CALIBRATED SHORT WAVE. Date

1. GENERAL DESCRIPTION.

This is a 7 valve five-band receiver incorporating calibrated short-wave band expansion. The sensitivity on both broadcast and short-wave bands is of such a high order that any increase would be of no practical value in the average location. The frequency ranges are as follows :-

Broadcast band

550 - 1600 k.c.

High-frequency bands

17,540 - 18,440 k.c.

15,060 - 15,520 k.c.

11,400 - 12,120 k.c.

9,460 - 9,820 k.c.

Thus the principal international shortwave bands are fully covered, and at the same time the tuning is expanded approximately twenty-five times. This results in the same ease of tuning on short-wave as on the broadcast band and produces an entirely new conception of short-wave listening.

In order to maintain absolute constancy of calibration silvered-mica fixed condensers and air-dielectric trimmers are used in the oscillator circuits and the receiver is also exactly compensated against changes in temperature. By means of a special circuit arrangement the oscillator frequency is maintained constant irrespective of changes in A.V.C. voltage. This greatly reduces the effects of fading.

A compensated volume control circuit is used in order to avoid loss of low frequencies at reduced settings of the control. The tone control operates on the negative feedback principle giving a wide range of control. A fixed amount of negative feedback is also employed to improve the tone quality of the reproduction. A "magic eye" is incorporated to ensure ease of accurate tuning.

The valves used are as follows :-

6K7G .. R.F. Amplifier

6K8G .. Converter

6K7G .. I.F. Amplifier

6B8G .. Detector Amplifier and A.V.C.

6F6G .. Output pentode

6U5 .. Tuning Indicator

5Z4G .. Rectifier.

• VOLTAGE TESTS.

A.C. High-voltage secondary of power transformer, from each rectifier plate to:-

centre tap .. 335V

Heater of rectifier .. 5V

All other heaters .. 6V

Dial Lamps .. 5V

D.C. (measured between point indicated and chassis)

First 16 mfd. electrolytic condenser	..	340V.
Second 16 mfd. electrolytic condenser	..	230V.
Screen of 6K7G I.F. amplifier & 6K8G	..	95V.
Screen of 6K7G R.F. amplifier	..	100V.
Plate of 6B8G	..	60V.
Cathode of 6B8G	..	IV.
All other cathodes	..	0V.
Negative terminal of first 16 mfd. electrolytic condenser	..	17V.
Junction of 45 and 210 ohm resistors	..	3V.

All measurements should be made with the receiver tuned to approximately 1000 k.c. and with no signal input.

3. RESISTANCE TESTS.

<u>Where measured</u>		<u>Approx. Resistance in ohms.</u>
Across power cord	..	45
Each rectifier plate to centre tap of power transformer secondary	..	300
Across speaker field	..	1500
Speaker transformer, primary	..	500
I.F. Transformer Coils	..	7
B/C aerial primary	..	35 *
" " secondary	..	5
B/C R.F. primary	..	70 *
" " secondary	..	5
B/c Osc. primary	..	2
secondary	..	4
S/W Aerial, R.F. and Osc. } primary	..	0
} secondary	..	0
Between negative terminal of first 16 mfd. electrolytic condenser & chassis	..	255

4. ALIGNMENT PROCEDURE.

I.F. Alignment. The intermediate frequency is 455 k.c. At the factory the I.F. channel is aligned with a frequency-modulated oscillator and oscilloscope to produce a flat-top response curve and so no attempt to realign the intermediates should be made unless the I.F. sensitivity is found to be below normal. However, the characteristics of the I.F. transformers are such that, if they are aligned for maximum response using a normal amplitude-modulated signal generator or oscillator, the resonance curve will not depart very greatly from the flat-top shape. An approximate idea of the shape of the curve may be obtained by swinging the signal generator frequency across 455 k.c. and noting the change in output after lining up in the usual way. It will generally be found that by screwing out the top adjusting screw in the first I.F. transformer (only) a fraction of a turn until the output voltage drops approximately 10%, the correct resonance curve will be obtained.

The lead from the signal generator to the grid of the 6KBG tube should not provide a D.C. path to chassis, as this will remove the bias from the tube. A condenser should be inserted in the lead, if necessary, and the normal grid-cap should be left on the tube. This condenser is incorporated in the R.N.Z. All Wave Dummy Antenna.

B/C Band Alignment. Connect aerial and earth leads to signal generator through standard all wave dummy antenna and connect output meter in circuit across speaker transformer. Set dial-pointer so that centre of pointer is directly behind centre of line marking end of scale when gang plates are fully meshed. The location of trimmers under the chassis is shown below the circuit diagram.

Set signal generator frequency at 1400 k.c. and tune receiver to 1400 k.c. on dial scale. Tune in signal by adjusting B/C oscillator trimmer, which is accessible after removing cover plate on rear of chassis. Adjust B/C R.F. and aerial trimmers for maximum output. Set signal generator at 600 k.c. and tune-in signal. Rock gang and adjust 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 positions of B/C stations on the dial.

S/W Bands Alignment. Switch to 16 metre band and set dial at 18 Mc. Set signal generator frequency at 18 Mc. and tune in signal by adjusting 16 metre band oscillator trimmer. Switch on 570 k.c. oscillator in Frequency Standard SF2 and note points on dial at which signal is received. These should be at 17,670 and 18,240 k.c. If high output from Frequency Standard is used, weaker signals, which are images of other harmonics, will be received at other points on the dial, so the output from the Frequency Standard should be reduced if these images prove confusing. Due to the difficulty in accurately setting the normal signal generator or oscillator it is necessary to use the Frequency Standard to set the oscillator frequency. The oscillator trimmer should be adjusted to bring the 17,670 and 18,240 k.c. signals at their correct points on the dial. Now set dial at 17,800 k.c. and adjust signal generator till the signal is heard. Adjust 16 metre R.F. and aerial trimmers for maximum output. If there is any slight discrepancy in the amount of bandspread the oscillator trimmer should be adjusted so that the actual short-wave stations are tuned at their listed frequencies in the recognised international S/W broadcast bands which are -

17,750 - 17,850 k.c.

11,700 - 12,000 k.c.

15,100 - 15,350 k.c.

9,500 - 9,700 k.c.

If the signals are received at two points when adjusting the oscillator trimmer, the correct adjustment is that with the trimmer screwed farthest out. Similarly, if two peaks are noted when adjusting the R.F. and aerial trimmers, the correct setting is that with these trimmers screwed farthest in.

Now switch, in turn, to the 19, 25, and 31 metre bands and repeat the above procedure. The actual alignment of R.F. and aerial trimmers should be done at approximately the centre of the scale, that is, 15,200, 11,700 and 9,600 k. By utilising the Frequency Standard in conjunction with the receiver it will be possible to obtain approximate dial settings for the signal generator for these

frequencies. However, the 570 k.c. oscillator in the Frequency Standard should always be used to fix the exact calibration on the receiver being tested. The points at which harmonics of the 570 k.c. oscillator fall are :-

17,670 k.c.	15,390 k.c.	11,400 k.c.	9,690 k.c.
18,240 k.c.	11,970 k.c.		

5. SENSITIVITY TESTS. (Microvolts input to give standard output of 50 milliwatts)

<u>Frequency</u>	<u>Input to</u>	<u>Microvolts</u>
455 k.c.	Grid of 6K7G I.F. Amplifier	5000
455 k.c.	Grid of 6K8G	125
1400 k.c.	Aerial lead through standard dummy antenna	Under 1
1000 k.c.	" " " "	Under 1
600 k.c.	" " " "	1
16 metre band	" " " "	Under 1
19 " "	" " " "	Under 1
25 " "	" " " "	Under 1
31 " "	" " " "	Under 1

6. FREQUENCY STANDARD MODEL SF2.

This consists of a 570 k.c. temperature-compensated oscillator with built-in power supply. The harmonics of this oscillator fall at convenient points in the S/W bands covered by Model 75, and are used for calibration and alignment.

Before using the Frequency Standard it is essential that its frequency be set accurately. To do this, tune in Station 2YA on the receiver under test and switch on the Frequency Standard. After allowing 10 minutes for the initial warming-up of the oscillator valve in the Frequency Standard, adjust the trimmer knob on the front panel until the note which is heard is reduced to zero beat. The frequency is, by this means, adjusted to 570 k.c., and the harmonics will then serve as accurate frequency standards for alignment of the S/W Bands.

7. GRAMOPHONE CONNECTION.

Owing to the limited demand for gramophone pick-up connections, it is not standard practice to incorporate such arrangements in this receiver. Instructions covering the necessary modifications may be obtained on application to the factory and, if required, the additional parts, already wired for connection to the receiver, can be supplied at a nominal charge.