£ 16.15.0

N.Z. Courtenay

DEALERS' SERVICE DATA

No. 8

MODEL 5B1.
BROADCAST BATTERY OPERATED.

FIRST EDITION, OCTOBER, 1935.
CIRCUIT D186

TURNBULL & JONES LTD.

Head Office: Wellington.

AUCKLAND, HAMILTON, PALMERSTON NORTH, CHRISTCHURCH, DUNEDIN.

1-Ba

BATTERY OPERATED.

"B" Batteries required	90 volts, 8-16 M.A.
"A" or filament battery	2 volts, drain 600 M.A.
"C" batteries (mounted on chassis)	1 x 4½ volts, tap at 1½ volts
Power output	300 milliwatts
Valves used	1-1A6 (or 1-1C6), 2-32, 1-30, 1-19, 1 p.l. lamp 2 v. 100 M.A.
Intermediate frequency	465 K.C.
Broadcast Band frequency	550-1500 K.C.

GENERAL INSTRUCTIONS FOR LINING UP

This method of line up presumes the possession of a standard signal generator covering all frequencies.

First, connect output from signal generator to grid of 1C6 mixer, and take care that ¼ MF. condenser is between 1C6 grid and signal generator output, as otherwise bias would be short-circuited in this valve.

Set standard signal generator to 465 K.C. and align up I.F. transformers. These are aligned from top of chassis in the cans at back of chassis. Read microvolts absolute input as required to give standard 50 milliwatts output as shown on accompanying chart. Next, to line up the broadcast bands, set must be removed from cabinet. The broadcast trimmers are mounted underneath chassis.

TO LINE UP BROADCAST BAND proceed as follows:—

(1) See that pointer is adjusted in a horizontal position when condensers are ful in, that is, full capacity.

(2) Tune receiver dial to 1400 K.C. position. Adjust receiver oscillator and R.F. trimmers until 1400 K.C. signal from standard sig, gen. gives maximum output.

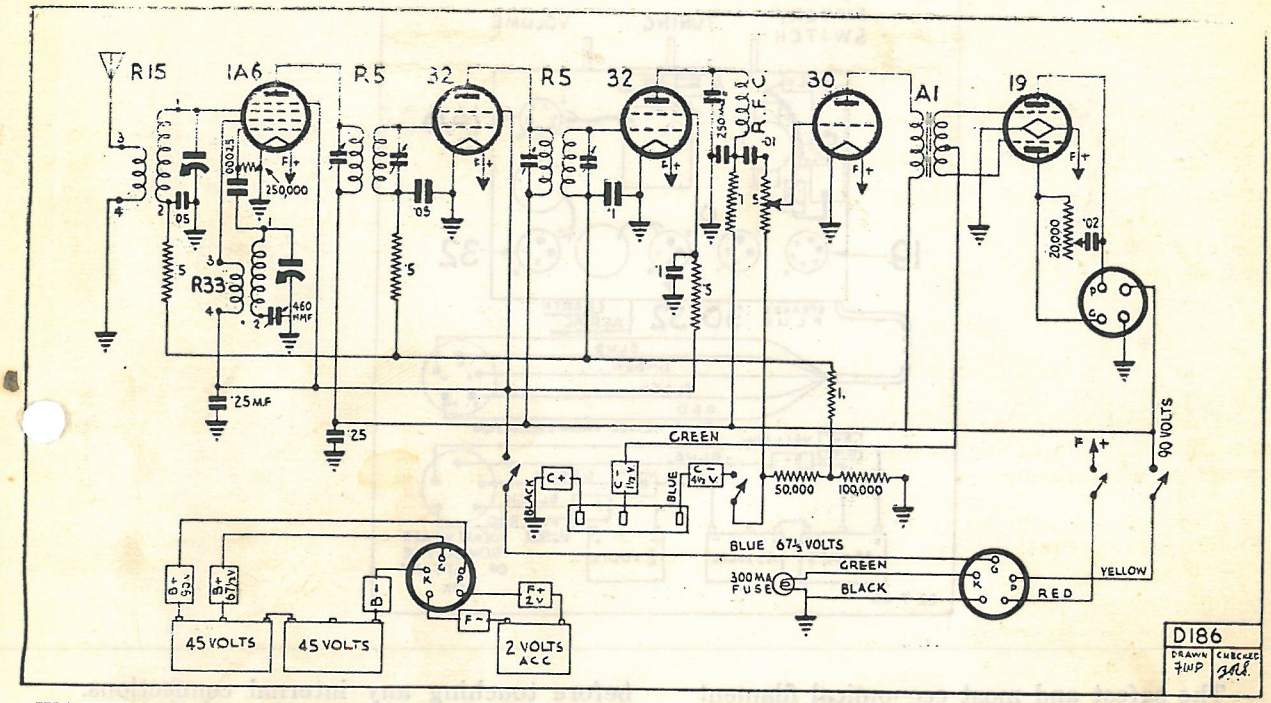
(3) Set receiver dial to 600 k.c. position. Adjust broadcast padder until 600 K.C. signal from generator gives maximum output. Check sensitivity with chart.

Important: Make no further adjustment on oscillator trimmer or padder condensers.

(4) Re-set receiver dial to 1400 K.C. position. Re-align R.F. trimmers only for maximum output of 1400 K.C. signal, and check sensitivity with chart. No further adjustment should be necessary for the broadcast band.

AVERAGE SENSITIVITY.

465 K.C.	5500	Micro-volts absolute to grid of 32 I.F. Amp.
465 K.C.	200	„ „ „ „ „ 1C6 Mixer.
1400 K.C.	30	Micro-volts absolute to sets Ant. (through Dummy).
1000 K.C.	25	„ „ „ „ „ „ „
600 K.C.	20	„ „ „ „ „ „ „



WARNING: When applying signal to grids of I.F. or mixer valves signal must be coupled through a .1 MF Cond. to avoid shorting Bias.

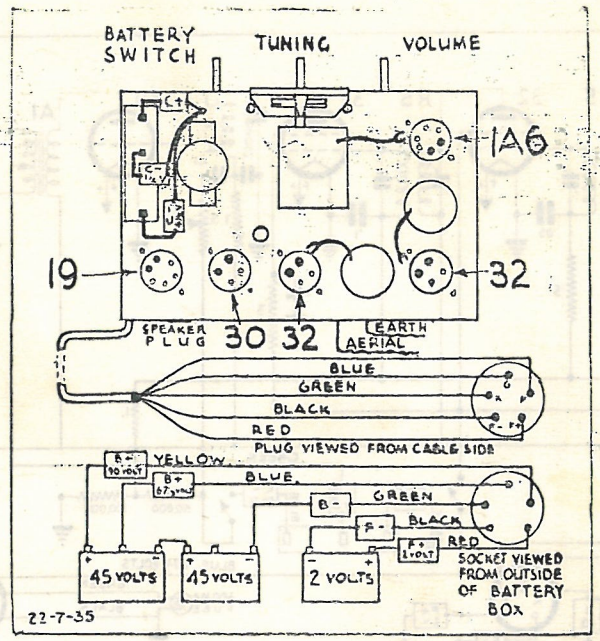
SPECIAL WARNING FOR SERVICE OF BATTERY SETS.

Care must be exercised in the service, adjustment and transport of this model battery set, as the valves are designed for the greatest economy in filament battery consumption, and are necessarily delicate and sensative to excessive voltage. Filament supply may be obtained from any of three main sources:—

(1) The most desirable and economical source is a **2 volt** accumulator which can be re-charged. In which case, no external series filament resistor need be incorporated. The rating of the 2 volt accumulator should be 90 ampere-hour or higher to ensure a few weeks' use without too frequent charging.

(2) Two, four, or any number of 1.5 volt dry cells may be connected in series parallel arrangement to give at battery terminals 3 volts. IT IS NECESSARY TO HAVE A VOLTMETER TO READ 2 VOLTS ACROSS FILAMENT LEADS TO SET AND A SERIES FILAMENT RHEOSTAT BETWEEN ONE SIDE OF BATTERIES AND FILAMENT. NOT MORE THAN 2 VOLTS SHOULD BE APPLIED TO FILAMENTS, or their life will be shortened or even burnt out.

(3) Certain types of 2 volt dry "air cells" are available, but their initial voltage when new is slightly above 2 volts, and a special resistor should be added to prevent damage to valves.



The safest and most economical filament supply is 2 volt accumulator as in paragraph 1.

Care must be exercised that neither of the filament wires come in contact with any part of the "B" supply.

The 300 mil. fuse lamp mounted at rear of chassis will protect the valve filaments from at least half of the possible wrong or accidental cable connections as it will allow only the "B" current (8-16) mils.) to flow in normal connection, and blows out instantly if one of the wires to the filaments is accidentally connected to any part of "B." HOWEVER, IF BOTH FILAMENT WIRES BECOME ACCIDENTALLY CONNECTED TO ANY PART OF "B" OR "C" BATTERY, INSTANT BURNOUT OF FILAMENTS WILL RESULT.

The On-Off battery switch disconnects both high tension positive and filament positive, so that it is comparatively safe to repair a set if one is certain BATTERY SWITCH IS OFF, but a safer plan is to remove battery cable plug from battery box before touching any internal connections.

"B" batteries must not become wet inside of metal battery box or they will short circuit through same and shorten their life. Water and acid should not be allowed to run out of "A" battery and come in contact with "B's".

This set is designed to operate from 90 volts with 67 volt screen supply. If further sensitivity is required an additional 22½ volt block may be added in series with the 90 volt supply, or even a 45 volt block.

It is necessary to keep the screen tap on 67½ volts to minimise "B" drain.

The average battery drain and sensitivities are as follows:—

	90v 'B,' 67v SG:	135v 'B,' 67v SG
Sensitivity at:		
1400 k.c.	11†	2.5†
600 k.c.	40†	12†
Total "B" Drain:		
Untuned	8 M.A.	16. M.A.
Tuned to station* ...	6.5 M.A.	14. M.A.
Undistorted output ..	300 milliwatts	900 M.A.

*Volume off. †Microvolts per meter.

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N-Z Courtenay Radio

Service Supplements No 2

No. 2. Model 5B1

JUNE 1st, 1935.

ADDITIONAL INFORMATION REGARDING 5 VALVE BATTERY OPERATED BROADCAST RECEIVERS.

From some localities reports are now coming in that the 5 valve battery broadcast set would be more pleasing if more gain was available. Other districts report the same set satisfactory on daytime reception, and especially so on evening reception.

The set is designed to operate from 90 volts with 67 volts screen supply. If further sensitivity is required, an additional 22 volt block may be added in series with the 90 volt supply, or even 45 volt block. It is necessary to keep the screen tap on 67½ volts to minimise "B" drain. The resulting battery drain and sensitivities are as follows:—

	90v. "B," 67v. S.G.	135v. "B" 67v. S.G.
Sensitivity at:		
1400 k.c.	11†	2.5†
600 kc.c	40†	12†
Total "B" Drain:		
Untuned	8 M.A.	16. M.A.
Tuned to station* ..	6.5 M.A.	14. M.A.
Undistorted output ..	300 milliwatts	900 M.A.

*Volume off. †Microvolts per meter.

ANNOUNCEMENT OF NEW 7 VALVE BATTERY OPERATED DUAL WAVE. Model 7B1

A very unique feature is incorporated in the new 7 valve battery sets. Extreme sensitivity with maximum output of 2 watts is available but, naturally, requires more "B" drain than is necessary to receive "local" stations. A.V.C. alone accounts for only a small saving of "B" drain when tuned to a station. It seems quite natural to presume that after the "newness" is gone, the customer will ultimately settle down to listening to local stations, under which condition unnecessary "B" drain is going to waste in the set designed for maximum sensitivity and output.

A new scheme is incorporated whereby a switch mounted at rear of chassis and appropriately marked "Economy" and "Sensitivity" gives the customer a ready change from full sensitivity for listening to distant stations or short wave, to a local set still giving adequate power and saving almost 50% on the "B" drain.

The accompanying chart illustrates most graphically the "B" saving that can be obtained. For example, when listening to Christchurch in Wellington with switch on "sensitivity" (volume control off) 20 mills will be pulled from "B's." But if customer switches to "economy," only 11 mills are required, and set still gives adequate room volume, especially for the country listener.

A further saving will result in that the customer will probably use the "economy" switch a greater percentage of his listening time, and will, therefore, have only two "B" blocks to replace, the third one used only for full sensitivity will most probably last several months longer.

It is interesting to note that even when switched to "economy," Paris can be received on short waves, and considering that Wellington is supposed to be a poor place for reception, many localities will probably experience fairly good short wave reception on the 90 volt "economy" position.

All 7 valve battery sets leaving the factory since June 1st, have the new circuit and arrangement. The physical layout has been changed to prevent the possibility of regeneration within the chassis and the fuse lamp is on top of chassis instead of at rear, where it was sometimes broken. Tone control is also on top of chassis. The intermediate frequency is now 465 k.c., giving better selectivity, at the same time improvements to audio circuits give increased output and better fidelity of reproduction.

Sensitivity, power output and battery drain are given below:—

Economy Switch Position.	"Economy"	"Sensitivity"
"B" Voltage:	90 volts.	125 volts
"B" Drain:		
Not tuned to station*	13 M.A.	22 M.A.
Tuned to station* ..	11 M.A.	20 M.A.
Sensitivity:		
4100 k.c.	.3†	.25†
1000 k.c.	6.5†	.5†
600 k.c.	25.†	1.8†
Power Output:		
Undistorted	250 milliwatts	1.5 watts
Maximum	600 milliwatts	2. watts

*Volume off. †Microvolts per meter.

1C

Courtenay Radio

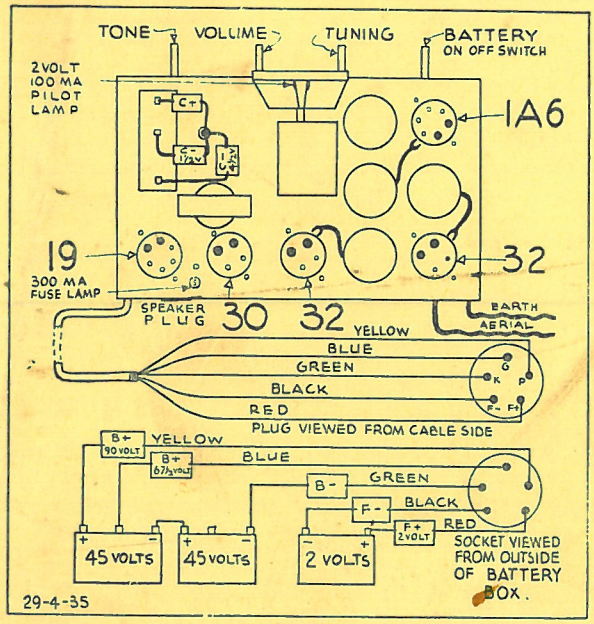
Service Supplements

N-Z Courtenay Radio

Service Supplements No 2

model 5B1

NEW 5 VALVE BATTERY OPERATED BROADCAST RECEIVER.



This is a new model designed to give extreme economy of battery consumption with reasonable amount of sensitivity and audio output. This model has been held in the Laboratory longer than was expected, to make exhaustive tests, not only on the economy of battery drain, but to ascertain what performance could be expected from such a model under various conditions.

The main characteristics are briefly as follows:—

Valves used are:

1A6	Mixer valve
32	Intermediate amplifier
32	Second detector, also supplying A.V.C.
30	Driver valve
19	Class "B" output valve.

Undistorted power output 500 milliwatts.
Filament battery 2 volts .5 amp. drain.
"B" battery, 2 x 45 volt blocks to give 90 volts with tap at 67½ volts for screen.

The average "B" drain measured in the negative lead is 8.2 MA when not tuned to a station and 6.3 MA when tuned to a medium strength station such as Christchurch received in Wellington.

Sensitivity at the low frequency end of the dial averages 25 microvolts per meter.

All above averages were arrived at after taking into account slight variations in battery type valves. The drain of 6.3 MA when tuned to a station was obviously with volume control off. When volume control is opened up "B" drain may be "instantaneously" up to 20 MA or more, but drops back to nearly 6 MA between words or items of music. Therefore, the average drain, while listening to set, though it depends entirely on the piece of music or speech listened to, will probably average round 8 to 10 MA. The extreme economy of "B" battery operation of this set does not handicap its ability to give a good ½ watt of signal from many stations throughout the broadcast band. Our tests in Wellington at the factory give agreeable day-time reception from Christchurch and Auckland, even though located in the centre of the town with a very high noise level.

After dark Australians are heard with quite fair volume upon this model. It is interesting to note that with the plate voltage as low as 67½ volts, it was still possible to hear Christchurch in the daytime in Wellington, at which time the static (i.e., volume shut off) "B" drain was under 4 MA.

When demonstrating this 5 Valve battery broadcast receiver in towns near a local transmitter, it will be found that the use of an aerial probably causes some overloading of local signals. This is due to the choice of a 32 intermediate frequency amplifier valve which gives slightly more gain than a 34 valve and also consumes slightly less "B" current, but cannot stand the excessive bias required from the A.V.C. system, to "hold down" the local signal.

This condition could not exist in the rural districts where battery set will be used, but for demonstrating in town, we suggest two precautions—either remove aerial when listening to local station or temporarily use a 34 I.F. valve while set is on shop demonstation, and be sure to replace it with 32 when delivering to customer.

We wish to call your attention to the proper place to measure the total "B" drain of a battery set. The meter should be placed in the negative lead between the batteries and the chassis. This will read the total "B" drain plus screen current. If the meter was inserted in the high tension (90 volt) lead, only the high tension plate drain would be measured without the screen current, and even better economy figures by nearly 2 MA would be indicated, but not altogether truthfully as far as complete drain and life of batteries is concerned.

This model is supplied with 8in. permanent magnet speaker and should fill a very definite demand for an economical broadcast receiver.

1B