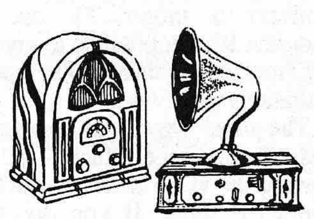
Vintage Radio

by PETER LANKSHEAR



RCNZ's Columbus in Australia

Although the Australian and New Zealand radio industries developed their own individual styles and products, there was some interchange. As it is interesting sometimes to see how the neighbours do things, this month we look at one of several Radio Corporation of New Zealand models that were exported to Australia.

Prior to 1930, Australian radio equipment came from many sources, especially Europe and America. As well, there was a range of locally made products, ranging from small components right through to complex superheterodyne receivers. These provide today's collector of early equipment with a fascinating variety to choose from, although admittedly there is never enough material to satisfy everybody.

During 1930, the Australian Government introduced a tariff system to protect and nurture local radio manufacture, and consequently the quantity of imported equipment was reduced considerably. The scheme was successful, and one significant benefit was that Australia was able to develop an extensive electronics industry which made a valuable contribution to the War effort during the 1940's.

Although most importing of receivers ceased, there were some overseas made sets that did find their way on to the Australian market, at least two brands being from New Zealand. These were the 'Ultimate' receivers made by Radio (1936) Ltd. of Auckland, and the 'Columbus' models from the somewhat pretentiously named Radio Corporation of New Zealand, located in Wellington.

John Stokes' book *Golden Age of Radio in the Home* has a fuller history of RCNZ, but briefly the firm was founded by a White Russian, William Markoff, who had migrated to New Zealand in 1926. In 1931 he made some primitive receivers for Stuarts Hardware, situated in Courtenay Place in central Wellington. Understandably, the brand name chosen was Courtenay. Before long improved receivers were being made, and as was common practice, many were rebadged for other distributors. Among these names were Pacific, CQ, Stella and Troubadour and in 1935 Philips, who were still tied to TRF technology, contracted Radio Corporation to make their first superheterodyne, the 516P.

During 1936 the Radio Corporation was reorganised, with production limited to two brands. Columbus was the Radio Corporation's own label, while practically identical Courtenay radios were now distributed by the major radio and electrical firm of Turnbull and Jones.

Business was good, and Columbus receivers were soon being exported to Australia. At least 25 different models are listed as having crossed the Tasman before the outbreak of World War II. In many instances they were installed in Australian made cabinets, a common practice to reduce duty and freight costs.

Recently I was given a dual wave five-valve plus tuning eye Courtenay mantel type 35 receiver. As this was one of the models that was exported, it provided me with an opportunity to satisfy requests to describe typical Radio Corporation receivers and how to deal with them.

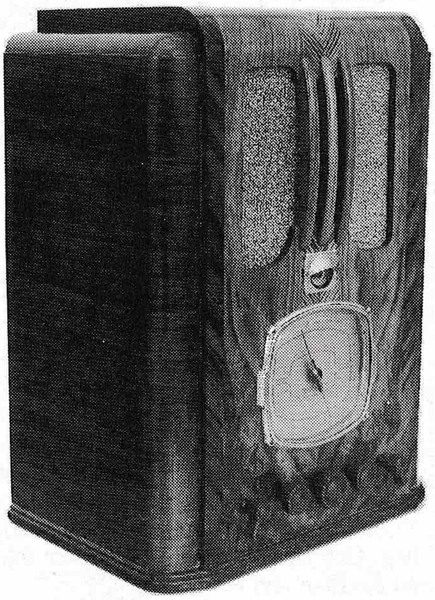


Fig.1: This handsome mantel cabinet, inlaid with no less than five different types of veneer, was but one of the patterns used for the Radio Corporation model 35 chassis.

Bandpass tuning?

With the exception of one feature, the circuit of the 35 is quite conventional, being basically the standard 'five valve' superhet comprising frequency converter, IF amplifier, a combined detector and audio stage and power output pentode. For more than 30 years this format was the mainstay of the radio industry.

It will be observed that between the aerial and the control grid of the frequency converter valve, there are two broadcast band tuned circuits, coupled by the small capacitance created between two twisted pieces of wire. An alternative and more common method was inductive coupling with the two tuned windings wound on a common former.

This type of 'bandpass' tuning was standard in the early superhets that were without an RF stage and used an intermediate frequency of about 175kHz. The oscillator operated 175kHz above the signal frequency, with the resulting beat becoming the IF signal. However, if a transmission 175kHz higher in frequency than the oscillator got through to the converter, it would also produce an IF signal.

The selectivity of a single aerial tuning circuit could be insufficient to eliminate reception of this unwanted 'image', when it is only 2 x 175 = 350kHz away in frequency from the unwanted signal. Hence the use of double tuning, to improve the image reception.

However by the mid 1930's, intermediate frequencies were much higher — generally in the vicinity of 450kHz, thereby eliminating the need for an extra tuned circuit for image rejection. Colum-

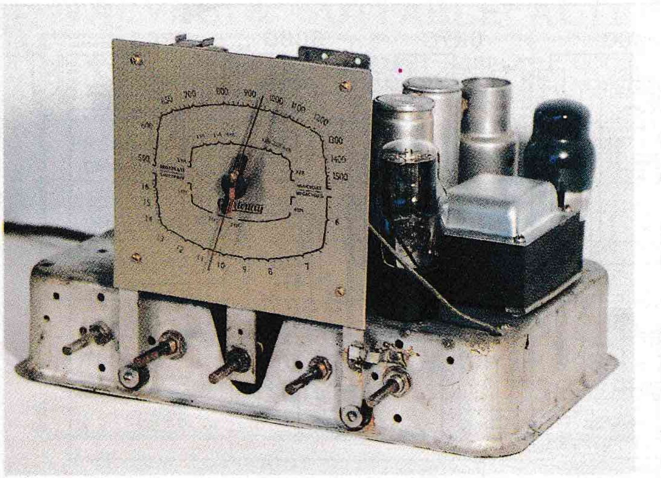


Fig.2: Radio Corporation frequently used a seamless chassis with rounded corners, much like a baking dish, which could be stamped out of a single sheet of steel — a novel construction that was both inexpensive and rigid.

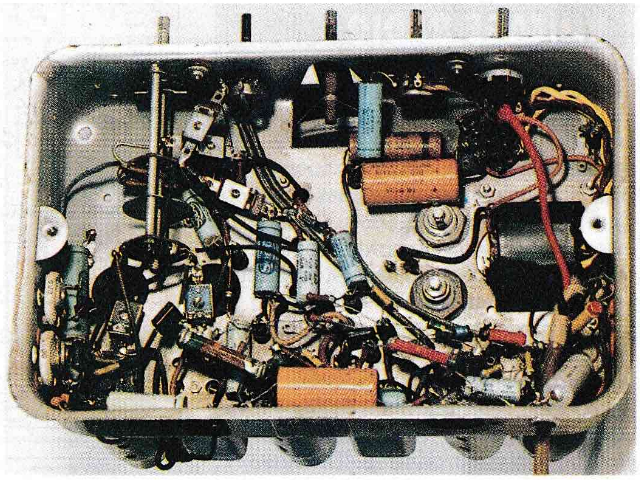


Fig.3: Underneath the chassis, showing that RCNZ wiring was reasonably tidy with many components supported on moulded standoff insulators. Here the original paper and wet electrolytic capacitors have been replaced.

bus had standardised on 456kHz around 1935 and as far as I can ascertain, in no other instance before or afterwards did they use bandpass tuning for receivers using this intermediate frequency. So why they used it in the model 35 is a mystery; a very odd situation.

There is a loss in signal transfer in these tuners, and it may be worthwhile experimenting with the capacitance of the coupling capacitor by varying the number of turns of wire.

Otherwise, the circuit of the 35 is quite conventional, but there are a few things to watch for when overhauling this and other Columbus receivers.

Damp storage, dirt

The cabinet on my receiver was in reasonable condition, although the lacquer had disintegrated to the stage where it was possible to scrape it off with a fingernail. A very grimy covering of what appeared to be a hardened mixture of oily soot and dirt covered the chassis. The aluminium coil cans and valve shields were, as well, pock marked with corrosion, indicating storage in damp conditions. Worst of all was the condition of the dial scale. This had been printed on metallic surfaced paper, which had deteriorated to the extent that it was covered with an unsightly etching of corrosion.

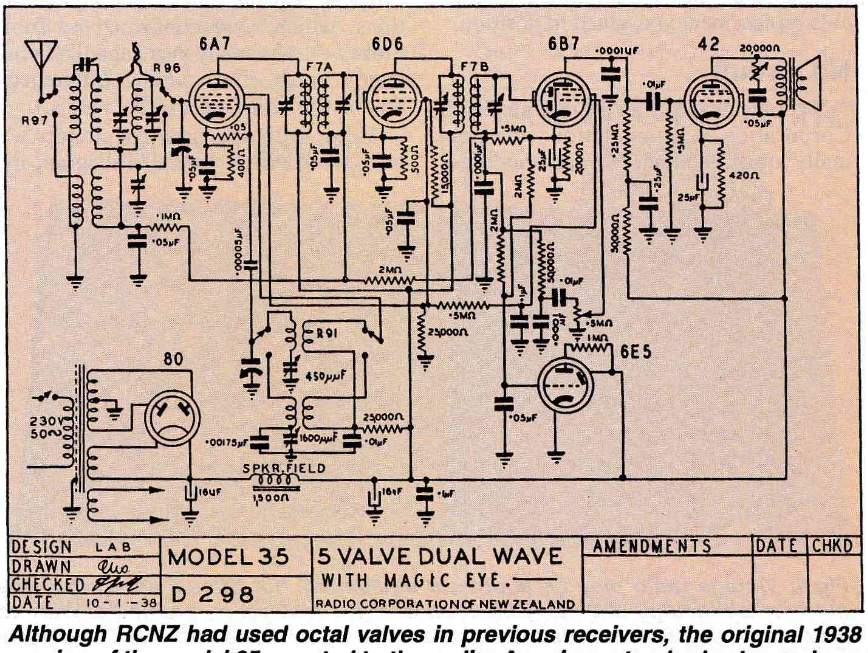
I made no attempt to 'try the set out'. It had in all probability been retired because it was inoperative, and storage conditions would not have improved matters. All that applying power would have accomplished would have been to confirm that the receiver did not go, and it is quite possible that there would have been further damage caused.

First the chassis was thoroughly cleaned. In an open-backed cabinet, a remarkable amount of grime can accumulate, and the nature of the dirt will often indicate where the set was used. Bedrooms leave a light dry fluff that can usually be removed with a vacuum cleaner. Coal gas fumes can leave a brown coating over metalwork, as can heavy tobacco smoking. Lounge rooms and offices produce dust that can be cleaned off with a small paintbrush and vacuum cleaner, but the deposits from cooking areas are more tenacious and can provide a clue to eating habits!

The worst case that I have ever encountered was a lovely old American Philco cathedral which had belonged to a bachelor, who fried everything. His radio had been for more than 40 years on a shelf immediately over his gas stove. The cabinet and chassis were completely coated in condensed grease; but when after considerable effort this was removed, the radio was found to be in quite good condition, having been practically 'embalmed'.

On the RCNZ chassis, what appeared to be a mixture of cooking oil and soot had produced very stubborn deposits. These required some hard work and patience to remove...

A dry pot scrubber gave the best results, although special care was neces-



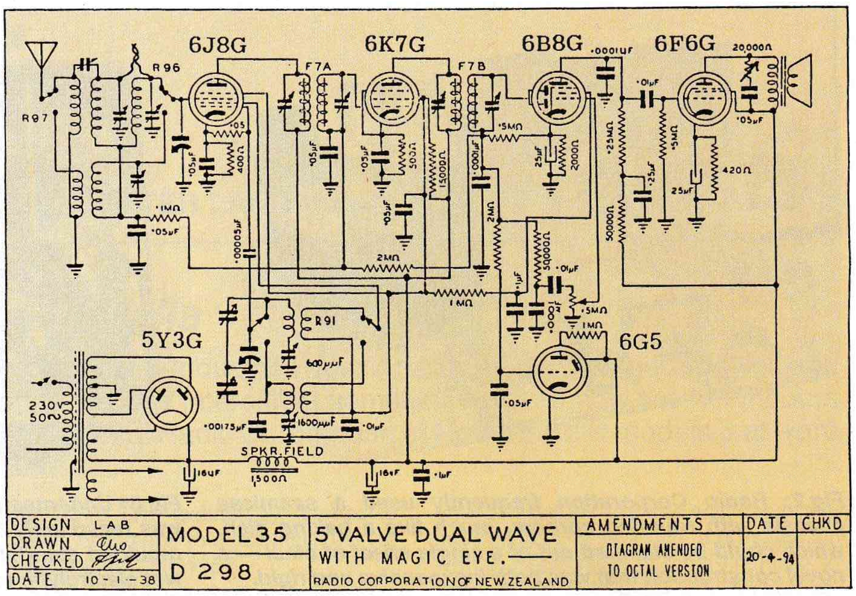
Although RCNZ had used octal valves in previous receivers, the original 1938 version of the model 35 reverted to the earlier American standard valve series.

sary to avoid any strands of metal getting into the 'works'. Coil cans and valve shields were cleaned up with fine sand paper and Brasso, but restoration of the dial scale presented a more serious problem. Columbus models had different artwork, but the treatment about to be described for the Courtenay dial could well apply to many other scales.

First the original scale was photocopied, with the contrast reduced to subdue the blotches as much as possible. These were then carefully blanked out on the copy with typist's white correcting fluid, leaving only the printing. The artwork, now looking reasonably tidy although a bit pale, was scanned with a 'Logitech' hand held computer scanner and the image loaded into WordPerfect. A laser printer was then used to transfer the image to a sheet of metallic surfaced paper.

There was no question of salvaging the finish on the cabinet. However, the old perished lacquer was very easily scraped off with a wide bladed chisel and after sanding, the cabinet was polished to enhance the grain of the handsome veneers.

The surfaces of the brass escutcheons had suffered from the damp storage, and at first inspection they looked very discoloured. However a good rubbing with Brasso worked wonders, and coating with shellac varnish restored them to the right colour. Finally the grille cloth, which had been removed before the cabinet was scraped down, was given some attention. As is commonly the case, the original was past redemption and suitable replacement was glued in position.



RCNZ were normally careful to ensure that circuit modifications were well documented, but although there were some significant changes, they appear not to have published a circuit of the 1938 octal version of the model 35. This amended diagram incorporates the known changes in the second model.

No circuit

Next step was to find the circuit. Radio Corporation documentation was normally quite meticulous, and modifications and production changes were regularly published. However, the system seems to have fallen down in the case of the 35. The only circuit that seems to be available is that the 1938 model which used the old standard pre-octal series of valves; but as luck would have it, my set, as well as some of the exported sets, has a 1939 chassis with glass octal valves. This would have been of little consequence had the first generation of octal valves, which were direct equivalents of the older valves, been used throughout.

It was possible to trace out the alterations, which were confirmed by John Stokes — who many years ago, had prudently noted down similar differences that he had found on a 1939 chassis.

Along with the original circuit, we have included an amended diagram incorporating the modifications for the octal version. Most significant changes were due to the use of the recently introduced 6J8G triode-hexode frequency converter in place of the old 6A7 pentagrid. This entailed operating the oscillator from the 100 volt RF screen grid line, rather than from the HT via the usual 25k dropping resistor.

Another variation is quite minor. By eliminating a 2M resistor in its control grid circuit, the drive to the tuning indicator was increased. This was probably to suit one of the newly announced remote cutoff type 6G5 indicators.

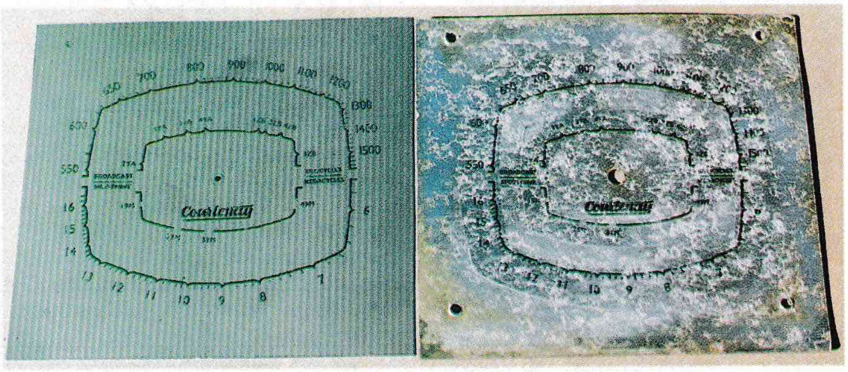


Fig.4: Vintage radio may be about old equipment, but there's no reason why modern technology shouldn't be used to solve restoration problems. With no way of reviving the corroded dial scale at the right, the replacement was made with the aid of a photocopier, computer and laser printer.

Leaking capacitors

Radio Corporation frequently used green labelled TCC paper capacitors in their pre-war receivers and there were still some present. These capacitors seem to be very susceptible to moisture absorption, and are practically certain to have very low insulation resistance. I do not even bother to measure their resistance before replacing them.

There were already second or third generation electrolytic capacitors fitted, and the two can type filter capacitors, long since dried up, were cleaned and left in position for appearance.

To reduce the 250 volt high tension to about 100 volts for the converter and IF amplifier screen grids, RCNZ frequently used a 15k/1W carbon resistor. The dissipation under these conditions is 1.5 watts, and consequently over the years, it is usual for these overloaded resistors to have increased in value.

VALVES & SUITABLE ALTERNATIVES

VALVE FUNCTION	FIRST MODEL	FIRST MODEL SUBSTITUTES	OCTAL MODEL	OCTAL MODEL SUBSTITUTES
FREQUENCY CHANGER	6A7		6J8G	6K8, ECH35, X61, X65
I.F. AMPLIFIER	6D6	78	6K7G	6U7G, 6S7G EF39, KTW63
DETECTOR/ 1ST AUDIO	6B7	6B7S	6B8G	6G8G, EBF32
OUTPUT	42		6F6G	KT63, 6V6G*
TUNING INDICATOR	6E5	ANY 6 PIN	6G5	ANY 6 PIN
RECTIFIER	80		5Y3G	U50

* With the operating conditions of the model 35, a 6V6GT or G is an effective replacement for a 6F6G.

Original and alternative valves for both versions of the model 35. Metal, G and GT valves with the same type number are interchangeable.

They can be replaced with a parallel pair of 27k and 33k 1W types.

RCNZ operated pilot lamps at reduced voltage, prolonging their lives considerably. Often, there was a tap on the filament winding, but in the case of the model 35, although not shown on the diagram, there is a 1.5 ohm resistor made from a length of nichrome wire. For many years, Columbus and Courtenay receiver dials were lit with 6V/3W single contact medium bayonet based lamps. These are now hard to find, but worth trying are vintage car accessory suppliers, or long-established bicycle shops.

As with any set being overhauled, all high value resistors carrying any direct current should be checked. Especial attention should be given to the anode and screen grid resistors of the 6B7/6B8G. A resistor often overlooked but frequently high in value is the 1M tuning indicator anode resistor. As in many receivers, this is hidden away in the socket of the indicator valve.

Poor power tranny

One Radio Corporation component has been much criticised. Their otherwise generally very good equipment was marred by their power transformers. For some reason, these were not impregnated in any way, and failures were all too common. Furthermore, in pre-war sets, rubber insulated wire was commonly used for the high tension leads, and this is likely to be disintegrating.

The best repair method is first to disconnect and remove the transformer from the chassis. Then replace the perished insulation with spaghetti or heat shrink sleeving.

It is possible, by taking some trouble, to improve the chances of survival of Radio Corporation transformers by impregnating the windings with paraffin wax. I have treated many RCNZ transformers with the method about to be described, and do not know of a single subsequent failure.

Impregnating with wax

First undo the bolts and remove the cover, being careful not to damage the brittle paper insulation. Then, in a *temperature controlled* oven, heat in a large can a kilogram or so of wax to 120°C. Immerse the transformer complete with core in the melted wax, and leave until the stream of bubbles that will emerge ceases. This may take up to half an hour or so, and when activity has stopped, lift out the transformer to drain.

With the transformer still warm, refit the cover and tighten the bolts to force out any wax trapped between the laminations. Finally, a rub down with a cloth will remove all traces of wax from the exterior of the core.

This treatment moisture proofs the transformer and significantly raises the insulation rating of the paper. The temperature should be just above 100°, only sufficient to drive out moisture, and **under no circumstances should anything other than a heat controlled oven be used**. As well as being dangerous, wax directly heated on a stove element can get extremely hot and ruin a transformer.

Finally, Columbus speakers were quite well made, but check for an open-circuited output transformer primary winding. Normal primary resistance is around 400 ohms and the field winding should be nominally 1500 ohms.

All being well, you will now have a working example of a typical New Zealand made RCNZ receiver, and one that is capable of giving good service.

Coincidence?

Alex Ellison of Boondall in Queensland has sent me some photographs of his German Telefunken D799WK receiver that, although not identical, has remarkable resemblances to the Russian receiver described in the December 1993 column, even to the controls and dial and the arrangement of four loudspeakers. An interesting comparison — thanks, Alex. ❖

Request for AWA circuit:

Mr. W.V. Woods of Glen Iris in Victoria needs a copy of the circuit for either an AWA C174 or Radiola 240 eight valve table model receiver. Can anyone help?