MARKETPLACE

Advertisements for the next bulletin should reach the editor by 14 July 2007. These must be neatly hand printed, typed or printed on a separate page, posted to the NZVRS or emailed to **office@nzvrs.pl.net**
Please no verbal or telephoned adverts, also don't forget to include your contact details; eg postal, telephone & email if applicable.
There is no charge for member's adverts but please remember that the NZVRS is not responsible for any transactions between members.

AVAILABLE

- Radio: Zenith, Transoceanic Royal "3000-1" date about 1930s(??). Battery, Wavemagnet, All transistor, Multiband. $100 ono.
- Boxes of miscellaneous new and used radio valves, looking for a good home. Donation to wife of exradioserviceman.

Rex Birch, P.O. box 5092, Whangarei. Email: alrx@ihug.co.nz Tel: 09 438 7670.

Radios from the collection of Phil McGechie;

- Crosley Band Box Jnr. Metal box 4 valve regen. 1930 uses 30, 31, & 34 valves.
- Bendix BC221 Frequency meter, restored.
- Ultimate model 728 tombstone radio 1934. (MGA p129)
- Altona 5 valve neutrodyne by Johns Ltd 1928, in tidy unrestored condition with 30 and 31 valves.
- Atwater Kent model 60 metal box radio, restored and goes well, but home made lid on box, original speaker. Made 1930.
- Majestic 90B console radio, restored, very good condition and a great performer, made 1929/30.
- AWA Radiola tombstone 4 valve radio, 1931, no model #, but made in England?? Good condition, restored at some stage, uses 24A, 35, 47 & 80 valves in TRF configuration.
- Courier FBX mantel radio, 1940, 9 valves, p.p. o/p, new 6U5, 4 b/sprd sw bands. Excellent condition.
- Stella Polaris mantel radio mantel radio. As new, vibrator powered [with hidden A.C. p.s.u.], 2 volt tubes, made 1935.
- Ultimate SG4 1928, Short wave 20-550 m., complete and going, plug-in coils, repainted case.
- Majestic model 460 console radio, 1933, ART DECO STYLE, in very good order.
- Selectra model E1 5 valve regenerative receiver, in solid oak cabinet, with three doors, uses 5, 201A valves, made 1926/27, restored and working.

Also have lots of components available;
Phil McGechie, 6 Les Marston Place, Pukekohe. Tel: 09 238 2285.

Plain unprinted valve cartons

- Small & GT size $12 per 100
- Medium size $15 per 100
- Large $25 per 100

Plus post and package per order.
Contact Paul Burt, 44 Hastings Street West, Christchurch 8002.
Tel: 03 960 7158 Fax: 03 981 4016
Email: dawn.lloyd@paradise.net.nz

WANTED

Any old E-M loudspeakers

- ripped cone is OK
- rusty is OK
- open circuit field is OK

Will pay freight costs.
Sam Lowe, 23 Hurdon Street, New Plymouth. Tel: 06 753 6693
Email: samlowe@clear.net.nz

NZVRS BULLETIN

Vol 28 No 2 May 2007

ULTIMATE'S RBP

NEW ZEALAND VINTAGE RADIO SOCIETY INC.

A non-profit organisation devoted to the preservation of early radio equipment and associated historical information.

Postal address - P.O. Box 13 873, Onehunga, Auckland 1643.
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Financial and membership matters are handled by the Treasurer. A list of members is available on application with a stamped, self-addressed envelope.
Please address all NZVRS monies to P.O. Box 13 873, Onehunga, Auckland 1643, N.Z.

LIBRARIAN, Ernie Hakanson, 17 Williamson Ave, Grey Lynn, Auckland. Phone 09-376 6059. Requests for circuit diagrams, books and magazines (for personal use only) are handled by the Librarian for a small fee. Back issues of most NZVRS bulletins are available from the Librarian at $4.00 each for Volumes 1 to 10 and $5.00 for Volume 11 onwards. Cheques to be made out to NZVRS.

NZVRS BULLETIN is published quarterly in the months of February, May, August and November. Opinions expressed by writers are not necessarily those of the Society.
Contributions, letters etc can be sent to:
THE EDITOR, Ian Sangster .
75 Anawhata Rd, R.D.2. New Lynn 0772 or
P.O. Box 13 873, Onehunga, Auckland 1643.

AUCKLAND MEETINGS
are held at the Horticultural Society Hall, 990 Great North Road (opposite Motions Road.) Western Springs.
Monday 21 May at 7.30pm. Non domestic radios eg military, service, fixed frequency, aviation etc
Monday 18 June at 7.30pm. Auction Night
Monday 16 July at 7.30pm. Crystal Sets

BAY OF PLENTY AREA MEETING
Date and venue of the next meeting yet to be advised.

TARANAKI AREA MEETING
are held on the second Sunday of the months of February, April, June, August, October and December. Visitors are most welcome; contact either Bill Campbell, Phone 06-753 2475 or Graeme Lea, 06-758 5344

WELLINGTON MEETINGS
are held typically from 1pm on the second Sunday of every month at Tireti Hall, Te Pene Ave, Titahi Bay. For details contact Bob Hatton, 40 Rose St, Wadestown.
Phone: 04-472 8788.

CHRISTCHURCH MEETINGS
are held at the Christchurch West Radio Clubrooms "Auburn Park", 333 Riccarton Road.
For further details contact Jim Lovell, 41 Yardley St, Avonhead, Christchurch 8004.
Phone 03-342 7760

FROM THE EDITOR:

This Bulletin will be the first under a new editorial team. We have not been successful in attracting any of our members to replace Reg, as a dedicated full-time Editor.
Therefore the committee and I shall hold the fort. I must say computing and word processing has progressed since last time I produced a Bulletin.
If anyone thinks they have an interest in becoming Editor and have the skills necessary please write to the secretary.
Thanks to all the writers who have contributed material, this has a made the task easier for me.

Please note that in future correspondence, ads and articles for the editor should be addressed to:

The Editor
P.O. Box 13 873, Onehunga,
Auckland 1643
or emailed to: office@nzvrs.pl.net

NEW MEMBERS:

Fyfe N	**Wellington**
Louden R	**Auckland**
Rosengreen J A	**Australia**
Jones B E	**Auckland**
Fahy D	**Kaipoi**

Cover Picture: Ultimate RBP

"Picture this radio hanging on the wall or as a standing upright model", says the 1952 brochure.

Cover story on page 12.

CONTENTS

NZVRS AGM 2007 feedback

This year's AGM followed the usual format of trading tables from 10 am, the Crystal Set Construction project judging on the side and a DVD set of the Australian Collections running in the front. Our grand old man – Bill Farmer was presented with a birthday cake in celebration of his 93rd birthday with cutting assistance (barely needed) from Gerry Billman whose birthday was the day before (but of somewhat lesser count).
The AGM proper saw a minor change to the committee with Murray Stevenson being elected on and John Hutchinson slipping off. The remaining committee members remainded unchanged; Ian Sangster president, Paul Woodcock secretary, David Crozier treasurer, and the other committee members are Murray Stevenson, Lloyd Anderson, Ross Paton, Bruce Churcher, Tania Robertson, Clarry Schollum & Owen Young. Ernie Harkanson remains librarian and Gerry Billman kindly offered to take on club capacitor sales processing for the next year, which should improve service to members, however the position of Bulletin Editor is still available.

Bill and Gerry have a cut at the cake.

Crystal Set Competition Comment

The 2007 Crystal Set Construction project may have had fewer entries than last years Hiker's One project however it was obvious that exceptional craftsmanship, care, skill and effort had been used to present crystal sets of outstanding quality. While most sets were locally made, there was an entry sent up from Christchurch.

The judges awarded merit for the best performance to a simple but well executed design made by Phil McGechie. The overall winner, including outright winner of the design and execution sections, was an exceptionally fine set made by Colin Bowring. Colin gets a free NZVRS subscription for 2008 and we hope he might write a little about the background and construction of his set.

(Yes done -see item in this Bulletin. Ed)

Many thanks to all who entered into the spirit of this competition. Next year we propose a more modern crystal set project; a set made from recycled modern materials. The guidelines for the 2008 AGM construction project are inserted with this bulletin.

Doug Edgar's Mad March garage sale "to clear some space" had the proceeds kindly donated back to the Society.
Picture on left is a corner sample of the goodies that "had to move".

Some highlights of activity about the branches;

The John Collins Garage Sale in Tauranga (April 2007)

Bargain hunters looking for that elusive something at the John Collins Garage Sale.

A "depleted" collection compared to its original condition earlier in the day.

Henderson Transmitting Hall Field Trip

VRS Members inspecting the working equipment at the Henderson Transmission Hall.
(There was a "no-touch policy" and several warnings hence a number of folded arms!)

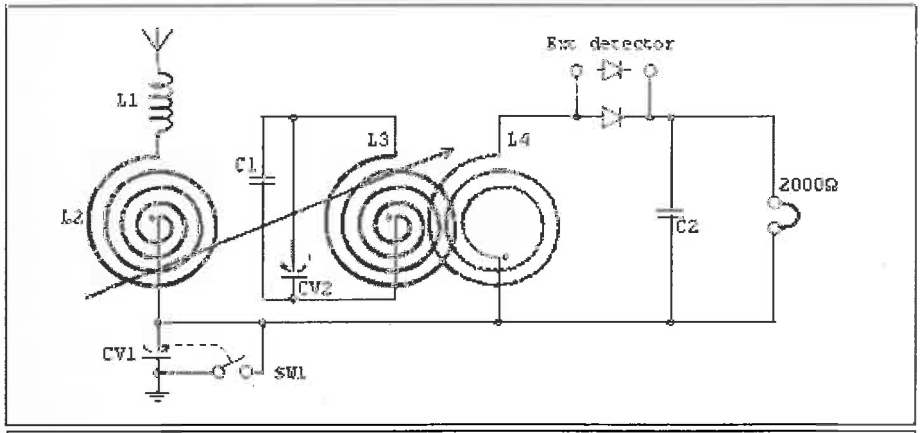
Talking heads (in front of former 1YA RCA transmitter) marveling at some of the older "museum" items in the Transmitting Hall.
Interesting to compare the size of the old 1YA transmitter with the more modern unit in operation today seen in the next picture (Ed).

Henderson "AM Broadcasting" Transmitting Hall modern transmitting equipment.
Note 1YA transmitter first from right.
Interesting to see there was still use for an analogue 'scope in here - lower right (Ed)

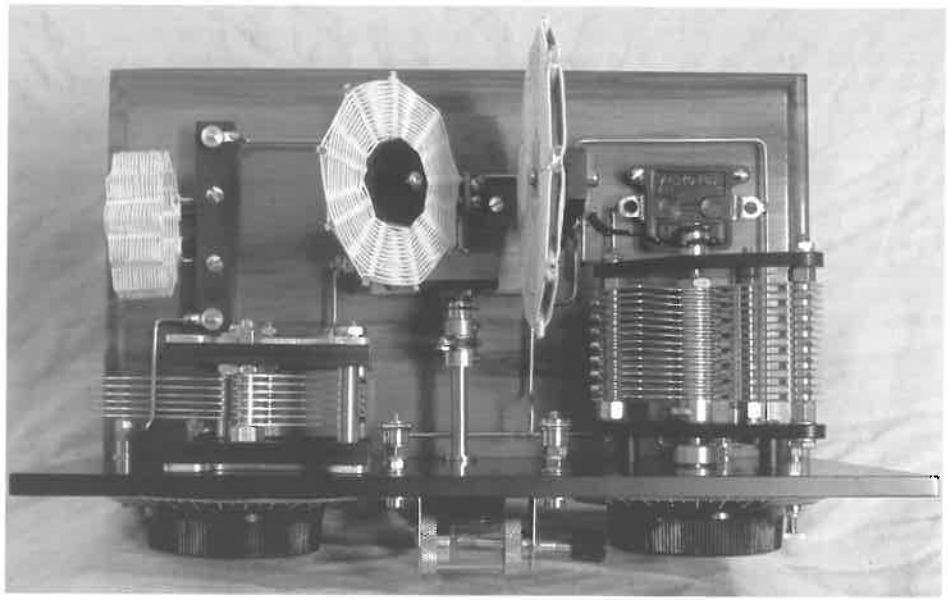
More views of the clean, unstaffed operating hall at Henderson.
Interesting to compare with the vintage scenes of the Himatangi Transmitting Hall in the George King article later in this bulletin (Ed).

Colin Bowring's Crystal Set – a winner!

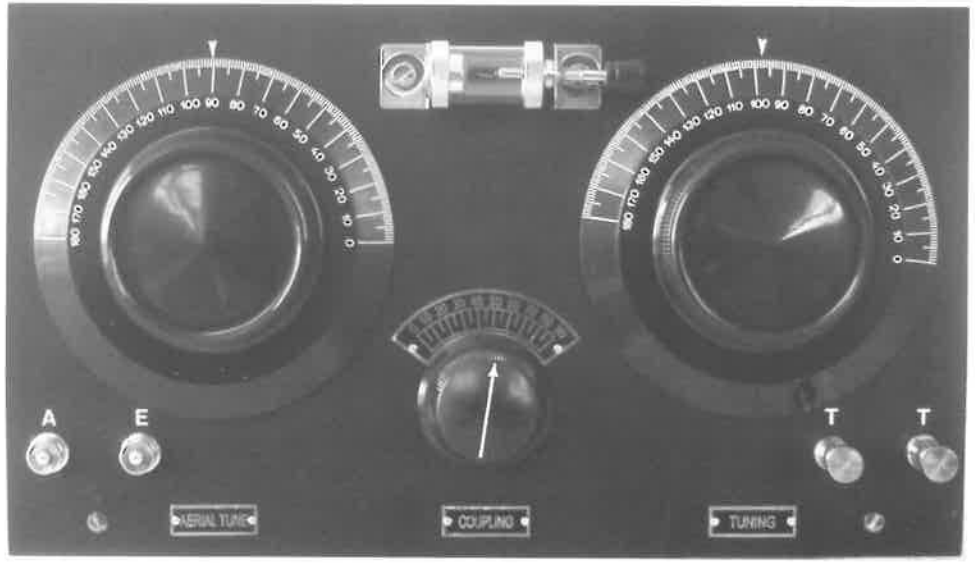
Circuit and operation



CV1	300pF	[AERIAL]	L1	46T 30swgDCC	
CV2	600pF	[TUNING]	L2	25T 24swgDCC	[COUPLING]
C1	40pF		L3	53T 24swgDCC	
C2	.004uF		L4	11T 30swgDCC	
SW1	Bypass sw - Direct earth when CV1 [AERIAL] fully closed				



Plan and Elevation views of Colin's Set



CRYSTAL SET STORY

by Colin Bowring

I have wanted to build an early type crystal set for some time and the advent of the NZVRS crystal set competition provided the incentive to get started.
In researching various designs for inspiration I came across an interesting set dubbed "the mystery crystal set". Details of this set were first published in 1932 and it was quite unconventional in that it used two coils wound together turn over turn on the same cylindrical former. This arrangement apparently performed well, but how it worked was not easily understood, hence the name 'mystery crystal set' (for full details see http://www.clarion.org.au/crystalset/mystery.html).

After lashing up a test set I evaluated the standard mystery set as good, but in my opinion, not spectacular. I liked the basic concept but the 'fixed' coil arrangement was somewhat restrictive. I felt spider web spiral wound type coils would be the way to go, as they are appropriate for the vintage era, usually have a high Q and I like the look of them. From this point on with much experimenting, trial and error, and guess work, 'my crystal set' eventually evolved into a completely new design.

Referring to the circuit diagram opposite, L2 is the aerial coupling coil which is inductively coupled to the tuning coil L3. The degree of coupling between L2 and L3 is variable through 90° via the front panel 'coupling' knob. At maximum coupling L2 is standing parallel to L3 with about 15mm between the two coils. At minimum coupling, L2 is lying horizontal with its outer edge about 35mm away from L3. The aerial is connected to L2 via L1, which is included to better match a 'standard' or long aerial. The earth is connected via CV1 which tunes the aerial coil L2 to the frequency of interest. SW1 is an internal part of CV1 arranged so as to bypass CV1 and connect the earth directly to L2 at the last 2-3°of rotation i.e. plates fully closed, extending the versatility to tune various aerial types.

L3 and L4 form the main tuning circuit. The station tuning circuit comprises of L3, CV2 and C1. L4 consists of 11 turns wound together with the last 11 turns of L3. That is the two wires are wound close together side by side. Note this tuning circuit (L3) makes no physical connection to any other circuit components; it is inductively close coupled to L4 and variably coupled to L2. C1 is a padder for CV2. The circuit around L4 is a standard detector and phones arrangement.

When I started this project the only suitable component I had was one variable capacitor. All the other component parts were either acquired along the way or made from scratch. I used some sort of hard plastic material (don't know what it is) that closely imitated ebonite as a substitute for the real thing for the coil supports and other bits where necessary.

Coil L1 is 46T 30swg DCC self supporting basket wound on an 11 peg jig. Coil L2 is 25T 24swg DCC spiral wound on a 30mm dia centre with 9 wooden 'fingers'. Coil L3 is 53T 24swg DCC and L4 11T 30swg DCC spiral wound together on a 30mm dia centre with 18 wooden fingers. L3 & L4 are wound in the traditional 'slotted disc' style, however the 18 fingers are arranged in pairs to form 9 winding slots with no material former or solid dielectric between the windings.

The crystal detector is home made, made from bits and pieces from my junk box. The glass tube was cut from an old test tube using a 'hot wire' technique described in some vintage literature.
The front panel labels and coupling scale are made from brass plate. Full size copies were taken from a 1925 parts catalogue and through various processes the labels were etched in a way similar to making a PCB. These were painted black, then sanded and polished to reveal the lettering etc in brass against a black background.

The base board was made and supplied by a builder who claimed the wood was salvaged from a very old cupboard. It is a nicely grained and heavy piece. Fine sanding and a couple of coats of clear lacquer resulted in an excellent finish. The remaining original old components were individually disassembled and cleaned up to a presentable standard before final set assembly.

This project took a lot of time to complete, but the end result is very satisfying. This set covers the whole broadcast band from about 500Kc to 1600Kc, and with a bit of practice any station can be tuned in with relative precision in a matter of seconds. The variable coupling enables a smooth transfer between sensitivity and selectivity. An ideal balance can easily be attained for a station of interest, depending upon the reception conditions prevailing at the time.

Colin's Crystal Set was the overall winner of the NZVRS 2007 AGM Crystal Set Competition (Ed)

A Happy HRSA 25th Birthday Celebratory Gathering

by Jack Whittaker

The HRSA function in Melbourne 13~15th April was a very well organised event and a most enjoyable get together for friendly vintage radio folk. Obviously a lot of planning and preparation work had gone into this event which was a great success. Melbourne weather was even cooperative too and it was in all a very pleasant weekend, with folk from many parts of Australia in attendance.

Peter Lankshear attended as an honoured member and was the centre of a question and answer panel, answering numerous technical questions – alignment queries, transformers, coils and other related vintage radio topics. Peter did very well and seemed to be enjoying himself too.

On Saturday, an auction comprising some 300 items of radios, various components and packages, took up a few hours. There was a display area of Vintage radios and equipment with a beautiful collection of consoles. Most all were playing old radio programme material from Gracie Fields to Dad and Dave etc., which were being 'broadcast' by a mini transmitter on the premises.

The Saturday evening dinner was great too, with a guest speaker/entertainer; namely, ventriloquist Ron Blaskett with "Gerry Gee". Ron co-opted HRSA President, Mike Osborne, who entered into the spirit of things as an extra ventriloquist's "dummy". That last word must be wrong, for Mike played the part brilliantly. It was a great show by any standards, which makes it hard to believe that Ron is 85 years of age! Ron is well known to older Australians for his performances reaching from the pioneering TV days in Australia back in the 1950s and 60s.

One of the radios on display was a Scott receiver and I could not resist taking a closer look. It was in 'as brand new' showroom condition, with all filaments glowing, but no sound was apparent (perhaps the volume was turned down). The rear chassis, with amplifier and power supply sections, was chrome plated and polished. What an amazing creation! The circuit diagram of a 26 tube Scott receiver is on page 47 in the circa 1940 book 'Lamphouse Radio Circuits'.

Obituary; Albert Desmond (Des) McNicol

Christchurch member, Des McNicol, died at Napier on the 4th of this month. Virtually confined to a chair or his bed over his latter years he still retained a sound interest in all that the VRS did and published.

Des was of South Canterbury farming stock who joined the RNZAF late in 1950. He was trained in radio servicing at Wigram's E&W School, gaining a very high pass mark before working as an aircraftsman on the Station's training aircraft.

By 1954, he had passed his fitter's course and was posted to Cyprus to take over 14 Squadron's (DH 'Vampires') radio servicing section at RAF Nicosia on the return of Bill Toft (late of TVNZ) to New Zealand. Des then moved with the Squadron to Tengah, Singapore, in 1955, during the Malaysian Emergency.

Later he returned to Singapore with 41 Squadron (Bristol 'Freighters') based at Changi. He was awarded the MBE (military) for carrying out duties well beyond normal call. By this time, he was married to one of the first postwar RAF WAAF's to join the RNZAF.

The latter part of his 24 year service contract with the Air Force was taken up with NCO in charge of SRS (Signals Repair Servicing) at Woodbourne, then being promoted to Warrant Officer and posted to the CTTB (Central Trade Test Board) in Stout Street, Wellington.

In civilian clothing, he worked for Tait Electronics in Christchurch, servicing any equipment that involved valves. Although he was to work with 'solid state' components before he retired, his great interest always remained with the former.

His home workshop was a fossicker's dream and there was also little room left in their double garage for either of their cars. The great upheaval in shifting to Napier at the beginning of this year, created a long running sale of equipment and components throughout much of 2006. What little that moved north with him, was a slim cross section of his extraordinary interest in radio.

Pete Ingram.

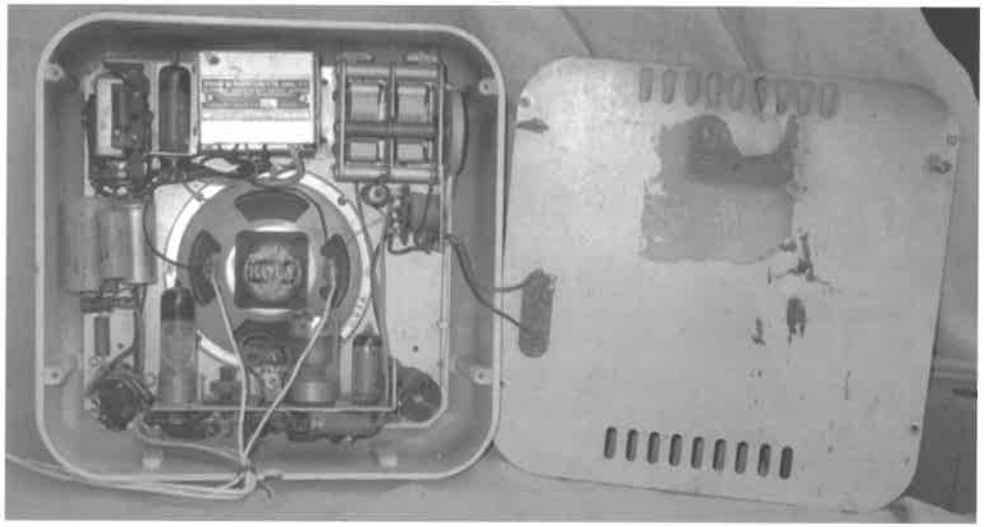
ULTIMATE'S RBP

Also known as the "hanging horror" **By Ian Sangster.**

Some years ago I attended a garage sale at Kevin Horn's in Waihi. I purchased from the wall a 1952 single page advertisement for this radio, because it had an original advertising photo attached to it. It is headed "Picture this radio hanging on the wall or as a standing upright model. It's a 4 valve superhet twin-purpose set at 15gns retail". The words **Picture Radio** and **Standing Model** are in larger text so from a distance they stand out.
Quoting from the advertising: Choice of colour is confined to ivory or rich walnut.
The valves are listed as 6X4, EL41, 7E7 and 6BE6.
There is a Subheading "Important to Country Dealers": Whilst good reception has been obtained (using an aerial) in certain country areas, dealers must understand that this receiver is in no way meant to replace the normal four valve moulded which is a larger and more powerful receiver. This model has been designed on compactness and price.

In my time collecting I had never sought this model out, but after getting the advertisement I thought I would see if I could get one or two of the sets. I now have one good one, hanging version, and a couple of not so good versions, cracked bakelite etc. I still do not have the version with feet.

It is an interesting little set, weighing 3.5kg or 7lb or so as far my bathroom scales can tell. This is not an inconsiderable weight to have hanging on a nail and a bit of string on your wall. And if the string or nail were to give way it would have gathered a bit of momentum by the time it hit the floor. This may account for the relative large number of cracked and otherwise damaged sets which I have seen. The string which I have on my good original was a solid Venetian blind type cordage, which I have replaced with a later type of the same thing lest it has rotted. I think there would be a danger of the power cord getting pulled or hooked on something and also pulling the set from its hanging point.

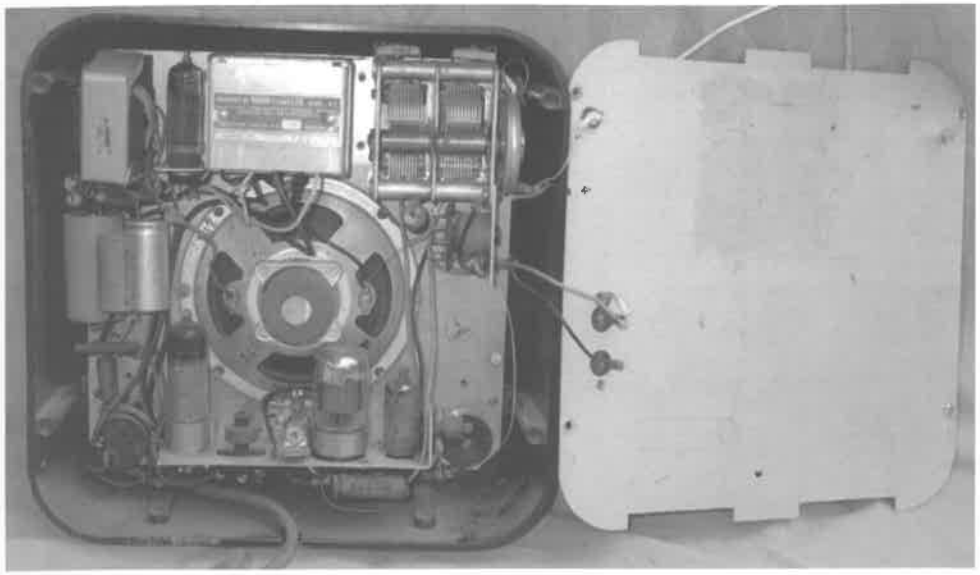


Rear view, my ivory version, note slotted cooling holes in rear cover.

The valve line up uses 7 pin miniature, loctal and rimlock, an odd combination. I don't know what factors decided this, if it was performance or availability, or a combination of the both. I have included the circuit diagram.

I have two complete RBP's, a walnut serial #147703 and an ivory #146976, it is interesting to note that the lower serial number one has slotted cooling vents in the rear plate, and the higher serial number has relieved cutaways at the edge of the rear plate, likely for the same purpose but maybe easier to manufacture.

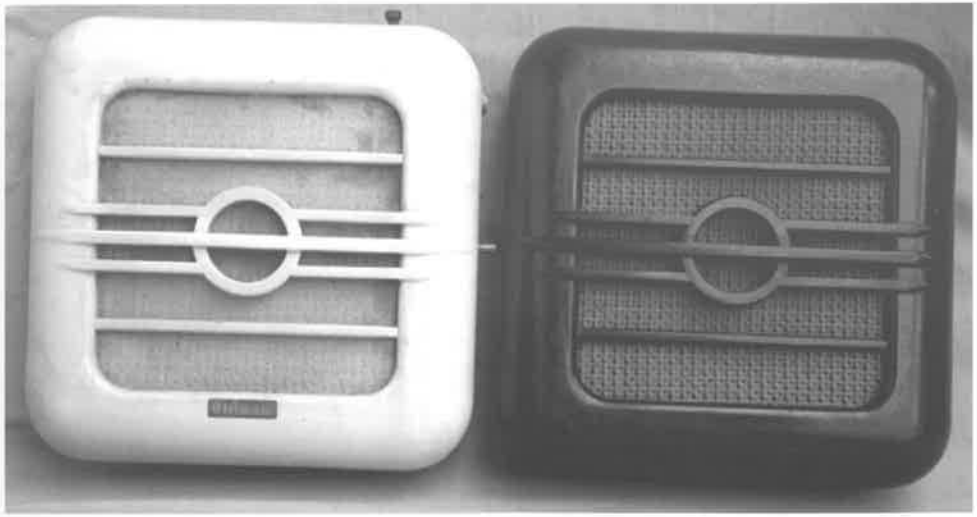
The cabinet moulding also is seen as an extension speaker, and an intercom station, in which case it is not drilled for the control shafts. From looking at the later Ultimate sticker on one of these units pictured, the moulding remained in use long after 1952.

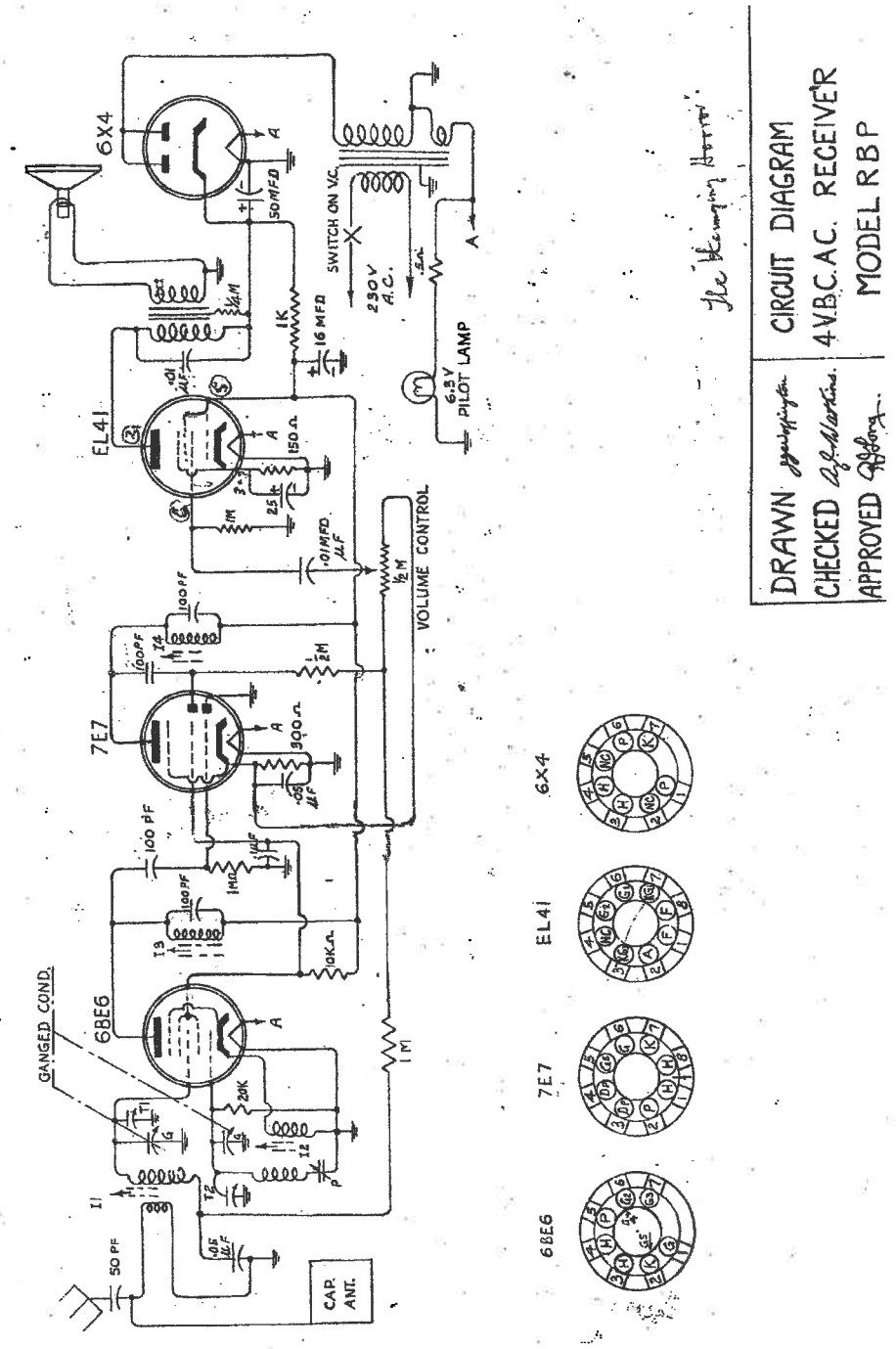


Later model, note different rear cover. The rear cover is connected to act as a built in aerial.

My circuit originally came from John Stokes and it carries his handwritten notes. These refer to the two 100pf in the plate circuit of the 6BE6 and the 7E7, he says "Simplex, replace!" referring to the makers of the originally fitted capacitors.
In addition he refers to the .05uf capacitor in the cathode of the 7E7 "strictly speaking should have been 25uf 25V … to bypass audio as well as RF." There is another note: "7R7 can replace 7E7".

These comments from John referred to above are on two sets. Serial number 148219; having 2 Ferroxcube IFT's and a Rola 15C2 speaker, and serial number 147376 having a Rola 5C speaker with a 1952 date.





HIMATANGI RADIO TRANSMITTING STATION - part 2

George King (ex Himatangi Radio)

INTRODUCTION to Part 2.

With the completion of the building programme at Himatangi Radio Station in 1952, work then began on the installation of the radio transmitters ranging in output power from four to fifty kilowatts. This installation programme involved the following transmitters and their associated low power frequency generating and drive unit equipment.

UNITED KINGDOM RADIO-TELEGRAPH – TBC4 Transmitter

The transmitter installed for the high speed telegraph to London was the General Electric Co Type TBC4 which provided an output power of up to fifty kilowatts into any of the "curtain" aerial arrays at Himatangi directed on the United Kingdom. If adverse propagation conditions ruled otherwise it could be fed into a "diamond" rhombic aerial directed on the Barbados relay station in the Caribbean for re-transmission on to London.

The TBC4 occupied an extensive floor space and was the highest power transmitter installed at Himatangi Radio. It comprised five separate units (in five separate cabinets) including an auxiliary power supply, one kilowatt exciter or driver unit, a final RF amplifier stage, a main H.T. power supply and a high tension control unit. The auxiliary power supply provided H.T. voltages of 500, 1200 and 3000 volts D.C. for driving the adjacent one kilowatt exciter or driver stage. The exciter stage contained the crystal controlled oscillator, frequency multipliers and one kilowatt distilled water cooled amplifier valves. The output from this driver stage was fed into the third cabinet containing and final R.F. amplifier incorporating two large water cooled output valves supplying an output power of up to 50 kilowatts. The fourth cabinet contained the main power supply which could provide a direct current of 7.5 amps at 15000 volts for the final amplifier stage .The fifth cabinet contained the high tension contactor relays which switched in the main high tension transformer as required whenever the high tension button on the front panel was activated. This high power transmitter provided a high speed telegraph service to London at a keying speed of 150 words per minute (as either on-off or frequency shift morse) on a selection of frequencies up to 22 MHz.

ML893A OUTPUT VALVES for the TBC4

The two output valves in this transmitter were "Matchlett USA" Type ML893A. Both were distilled water cooled from the station's distillation plant and water pumping system feeding the valves water jackets as well as the hollow turns of the final tuning coil. Some idea of the powers involved are evident from the following statistics pertaining to each valve:-

Output valve type ML893A
Filament voltage 20 volts
Filament current 185 amperes
Filament power 3700 watts
Anode voltage 20,000 volts (max)
Power output 50 kilowatts.

The ML893A was first produced in 1945 as a water cooled output valve for high power radio transmitters providing output powers in the region of 50 kilowatts. At the time of installation in 1953 the cost of each ML893A valve to the New Zealand Post Office was 300 pounds (N.Z.).

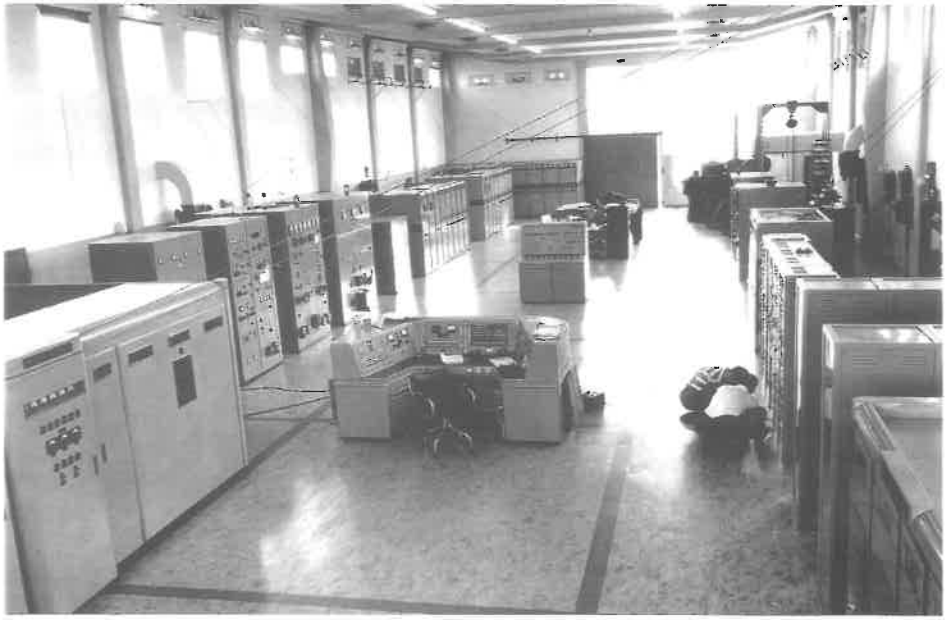
UNITED KINGDOM RADIOTELEPHONE – STC DS13 Transmitter

The transmitter employed for the radiotelephone service to London was a Standard Telephones and Cables Limited (S.T.C.) Type DS13 with an output power of 40 kilowatts on radiated frequencies up to 22 MHz. If propagation conditions permitted the DS 13 could provide a telephone transmission direct to London on what then became known as the longest direct H.F. radiotelephone service in the world.

The final output valves of the DS13 transmitter, together with the final tuning coil were also water cooled by means of distilled water being pumped through the valve water jackets and the hollow turns of the final tuning coil. The heated water was returned to a cooling system at the rear of the transmitter comprising an air cooled radiator and forced air fan system. The supply voltages for the DS 13 were 6000 volts at 1.2 amperes for the four kilowatt driver stage and 11,000 volts as 6 amperes for the final amplifier stage.

Like the previous transmitter, this London telephone transmitter also occupied a considerable floor area as the internal units of transmitter equipment were all housed within a security locked "walk in" enclosure.

As a point of interest, the water distillation plant at Himatangi associated with the cooling systems of the two London transmitters was legally required to be registered as a STILL with the New Zealand Customs Department.



The five separate units of this London telegraph transmitter can be seen in the centre left of the above photograph showing the transmitter layout at Himatangi. In the immediate left foreground, adjacent to the control console, a major portion of the London radio-telephone transmitter can also be seen.

VANCOUVER RADIOTELEPHONE AND TELEGRAPH – Marconi HS51

The transmitter installed for the new radiotelegraph and telephone service to Vancouver in 1958 was the Marconi Type HS5l with a rated output of 32 kilowatts peak envelope power on single sideband. This transmitter also occupied a considerable floor area and required a separate automatic fire protected sealed room to house the transmitter's high current rectifiers and heavy duty power transformers.

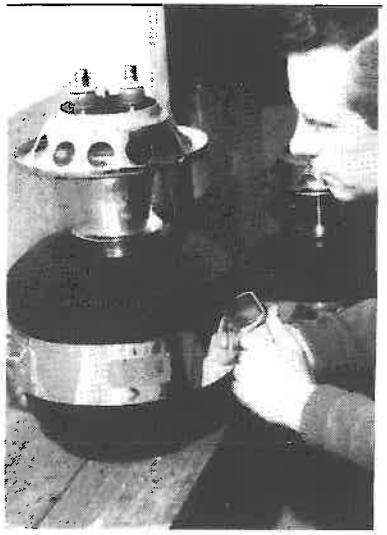
A notable feature of the HS5l transmitter was the final output valve Marconi Type BRI6l.

This impressive looking valve was a forced air-cooled transmitting triode fitted with a compact array of welded copper cooling fins and requiring forced air cooling at a volume of 20 cubic feet per minute. This air flow had to be started before the application of any supply voltage to the valve and continued for at least one minute after the supply voltages had been removed.

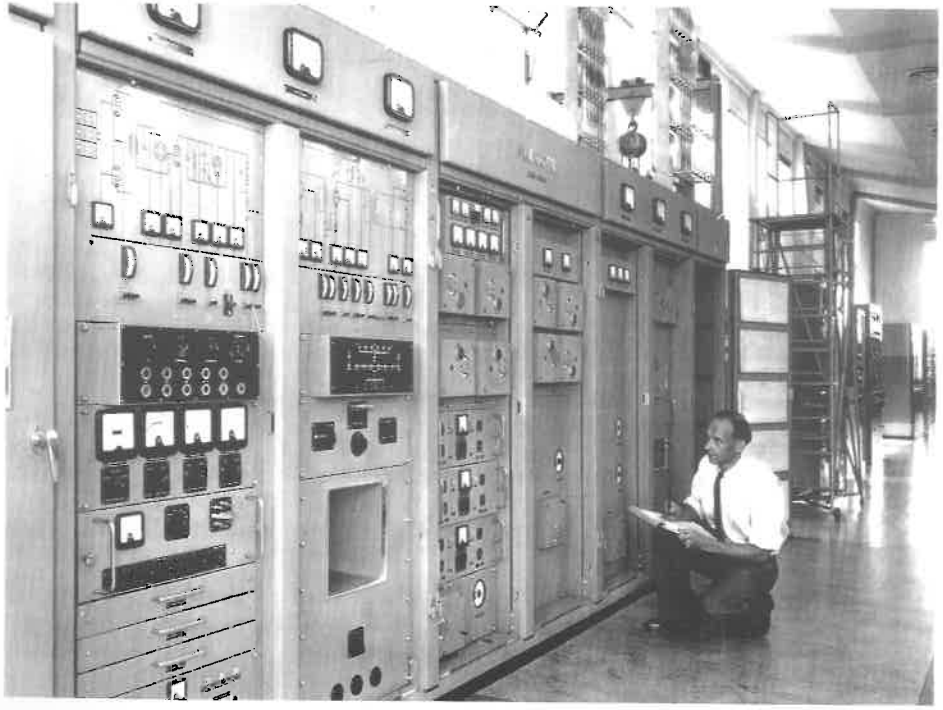
The operating conditions for the BR161 as an R.F. amplifier were as follows:

Marconi valve Type BR161
Filament voltage 9 volts
Filament current 175 amperes
Anode voltage 12000 Volts
Anode power 15 kilowatts
Valve weight 56lb (26 kg)

At no time during the switching on process was the filament current to exceed 450 amperes.



This photograph (left) shows a Himatangi staff member surveying the brilliant chrome of a BR161 valve.
The two filament connection studs are evident at the top of the valve, while the chromed upper heat sink provides the grid connection and the cooling fins clamp with the carrying handles becomes the anode connection.
The cost of a Marconi BR1616 valve to the New Zealand Post Office was 450 pounds (N.Z.)



The previous photograph shows the Marconi HS51 transmitter in operation while a staff member checks and records the transmitter meter readings to ensure that the various stages are operating within their specified limits. In the left foreground are the frequency multiplier stages which lead to the BR179 driver valve and final output (BRI61) stage.
Mounted atop the output stage are two racks of "dummy load" lamps into which the full high power output of the transmitter could be fed during line up or testing procedures when any "live" transmission was to be avoided.

HS51 TRANSMITTER (Cont' d.)
The multichannel output from this transmitter comprising two telephone channels on the upper sideband and multichannel telegraph on the lower sideband, was fed into the appropriate rhombic aerial directed on the Great Circle Map bearing to Vancouver ..
This new radio link to Vancouver in 1958 became the first stage in a more sustainable telephone and telegraph service to London comprising:-
(1) Himatangi to Vancouver via high frequency radio then
(2) across Canada via the Canadian microwave radio bearer system, then
(3) on to the United Kingdom (and London) via the trans - Atlantic submarine cable.

In the above photograph, station technicians are featured carrying out maintenance checks on an S.T.C. Type DS12 transmitter. While one staff member attends to the power supply contactors, the other technician checks the internals of one of the two 4.5 kilowatt R.F. "trucks" withdrawn on metal runners for maintenance purposes.

U.S.A. RADIOTELEPHONE

The transmitter installed for the telephone service to San Francisco was a Standard Telephones & Cable Ltd (S.T.C.) Type DS12 with an output power of 4.5 kilowatts over a frequency range of 4 to 27.5 MHz. The DS 12 incorporated two separately tuned radio frequency "trucks" fed from a common power supply to facilitate prompt frequency changing when required. The central portion of the total cabinet accommodated the transmitters' power supplies.

The R.F. output stages each employed an S.T.C. 5J180/E forced-air-cooled RF pentode valve providing 4.5 kilowatts of output power into the appropriate rhombic aerial directed on San Francisco.

Maximum ratings for the 5JI180E output valve were as follows:

Filament voltage 9 volts
Filament current 30 amperes
Anode voltage 6000 volts
Screen voltage 1500 volts
Anode current 2.5 amperes
Power output 5.75 kilowatts

AUSTRALIAN RADIOTELEPHONE

The transmitter installed for the telephone service to Sydney was of a similar make and model to that employed on the San Francisco service.

PHILIPS TRANSMITTERS

Three Philips transmitters were provided for the following services:-

(a) The Meteorological telegraph broadcasts to shipping and Pacific Islands
(b) The radiotelegraph traffic service to the Pacific Islands
(c) The radiotelegraph traffic service to shipping.

The Philips transmitters each comprised between three and five separate five kilowatt transmitters or "trucks" operating from a common power supply. Each individual transmitter provided an output power of 5 kilowatts throughout a frequency range of 4 to 25 MHz. In the relative photograph featuring the Himatangi Transmitting Hall, the three Philips transmitters can be seen in the far left comer.

R.C.A. TRANSMIITTERS

R.C.A. Type transmitters each providing 5 kilowatts of output power were utilised for:

(a) The U.S.A. radiotelegraph (machine printing) service to San Francisco
(b) The Australian radio picture (facsimile) service to Melbourne
(c) The Maritime Mobile H.F. telephony service to shipping.

These R.C.A. transmitters each covered a frequency range of 4 to 20 MHz.

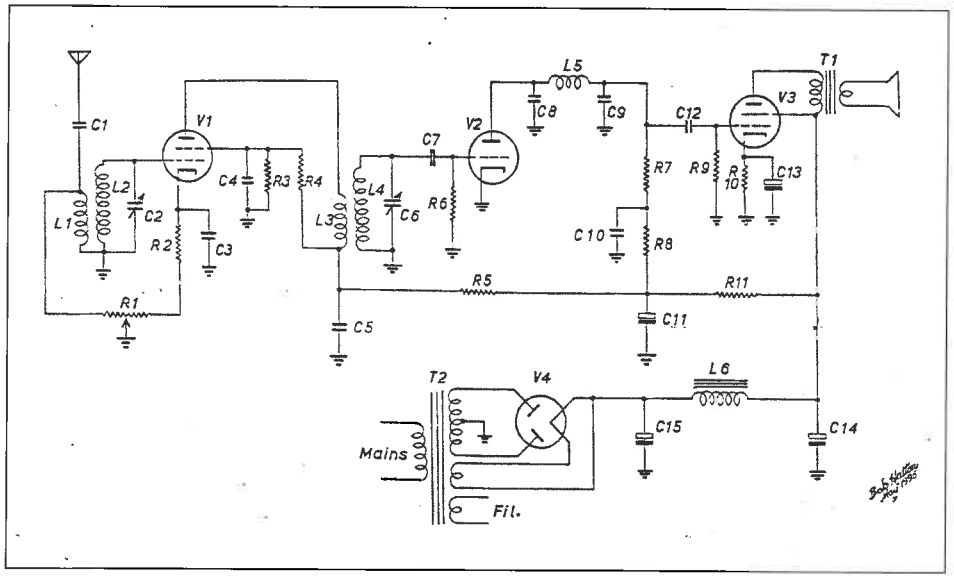
MARCONI TRANSMITTER:-

A Marconi Type SWB-11 transmitter providing an output power of 7 kilowatts was utilised for the machine printing telegraph service to Melbourne.

On The Purpose, Function and Value of Components - part 2

George Newlands

Continuing from last issue of the journal:



R9. This is the grid resistor of the output valve. It allows grid current to flow and stops charges building up on the grid. It forms the lower part of an AC voltage divider composed of CI2 and R9 and allows the bias voltage developed across RIO to be present on the grid. The value is not critical but must be high enough not to bleed off any significant amount of the audio signal. 0.5 megohm is common here. It can be noted that a valve control grid should always have a DC path, of some kind, to ground.

R10. This is the cathode bias resistor of the audio output valve. It serves a purpose similar to what RI and R2 do for the RF valve. The anode and screen currents of the valve combine to form the cathode current and this raises a voltage across RIO, the cathode being positive with respect to ground. The resistor value is chosen to provide the correct bias voltage for the valve. As this holds the cathode that much positive with respect to ground, and the grid is at ground potential (for DC) via R9, the grid is always that much negative with respect to the cathode and the valve is biased. The resistance value is determined by the cathode current and the required bias voltage.

R11. This is a decoupling and voltage dropping resistor which, with C 11, isolates the output stage from the rest of the receiver. These two components form a simple filter and the value of C11 governs, to some extent, the value of R11. R11 also drops the main HT, that is the voltage across C14 (lower powered stages require less voltage.)

C11. An audio decoupling capacitor which serves to keep the HT supply to the detector and RF stage clean. It needs to be an electrolytic to bypass audio signals and any 100 Hz hum from the rectifier. This electrolytic will commonly be found to have a 0.1 ufd paper capacitor in parallel with it. The minimum value of C11 is calculated by the "Eighty Thousand Rule". That is the product of

Rll and Cll should not be less than 80,000, R in ohms and C in microfarads. For example, if R11 = 10k then CII should not be less than 8 ufd. Any more will make no difference and less may be found to cause a problem. The value is not critical, probably a minimum of 8 ufds but anything up to l00s of ufd may be found, particularly in high gain audio amplifiers. It may be noted that manufacturers, ever with an eye to cost, will frequently use capacities which are lower than ideal but seldom greater. The cost of a capacitor rises with its capacity. (The cost of a resistor rises with its wattage rating.)

C12. The coupling capacitor which carries the audio from the detector to the output valve. It stops the DC on the detector anode from getting to the output valve grid and forms an AC voltage divider with R9. This capacitor needs to be a good one, with a conservative working voltage, as the slightest DC leakage will alter the bias on the output valve and cause audio distortion. Values between 0.005 ufd and 0.1 ufd can be found with 0.05 being very common.

C13. This is the decoupling capacitor which bypasses the audio signal which would otherwise be developed across R10. To understand the function it must be considered that both the primary of TI and R10 make up the load on the output valve and the output from this valve will be developed across both. As any signal developed across R10 is useless for output, C13 is there to see that it is all developed across T1. This can be amply demonstrated in a working set by disconnecting C13 and noting the drop in output level. This capacitor must have a very low impedance at audio frequencies and therefore the capacity is quite large, 25 mfds being a common value. The working voltage is only that developed across R10, notably the bias voltage of the valve. 25 volts is a common value and is generally more than adequate.

Cl4. The so-called smoothing capacitor. It has the job of ensuring that the HT supply to the receiver is clean of audio signals, 100 Hz hum and any other hash which may tend to be present on the line. It also ensures that the power supply does not become part of the anode load on the output valve. Note the similarity of the C 14/L6 combination to Cll/Rll and Cl0/R8. The capacity value is not critical and, as with C 11, may vary between 8 and several hundreds of microfarads. The working voltage should be high, with a good margin above the HT voltage to which it is applied. A 0.1 ufd paper capacitor is commonly found in parallel with this electrolytic.

C15. There are probably more strange ideas and misunderstandings about the purpose and function of this hard working component than all the other components of a set put together and for this reason some lengthy comment will be given. It is correctly termed a "reservoir capacitor" and, in the circuit shown, forms a "capacitor input filter" consisting of Cl5, L6 and C14. (The theory of filters is vastly complex and quite beyond the scope of this discussion.) Note the similarity to C8/L5/C9.

Put simplistically, what C15 does is to flatten out the 100 Hz "double half sine wave" produced by the rectifier valve. Effectively it absorbs power during the peaks and acts as a battery during the troughs. The value of the capacitor is quite important, if not critical, for two reasons. Firstly the output voltage from the filter, across C14, and secondly the peak current through the rectifier. To deal with the output voltage first. If C15 was removed the filter system would consist only of L6 and C14, thereby becoming a "choke input filter". The advantage of this is that the regulation, that is the voltage stability under varying current drain, is very much better than for a capacitor input filter but the output voltage is lower. This is no real advantage in a radio receiver, where the current drain is practically constant and such a system would require a higher HT voltage from T2 for the same HT at C14. Thus the system shown is invariably used in small receivers as it allows a smaller (and cheaper) T2 to be used.

The peak rectifier current governs the value of C15 more than does the output voltage. As previously stated the capacitor absorbs the peaks of the 100 Hz coming from the rectifier and the maximum capacity is governed by how much current the rectifier valve can cope with without damage or shortening of working life. The 100 Hz sets up a ripple current, or surge current, in the capacitor as it absorbs the peaks and fills in the troughs. As far as the rectifier valve is concerned this current is additional to the current being drawn by the receiver and the rectifier must have sufficient cathode activity to supply it all without undue stress. Valve manuals quote maximum "capacitor input to filter" values but they seem to be conservative. Minimum supply impedances, that is the resistance in the rectifier anode circuits, are quoted also. It can be noted that the maximum recommended capacity at the cathode of a 6X5 is 4 ufd but 8 is commonly found there. Modern sets, using multiple unit smoothing capacitors, frequently have as much as 20 in this position.

As another example, the venerable and ubiquitous 80 should not have more than 10 ufd in this position with less than 50 ohms anode impedance for a supply of 350 volts. If the capacity must be increased so must the supply impedance if the rectifier valve is to stay within its ratings. The values of capacity and impedance are governed by supply voltage too. A supply of 500 volts would require a minimum impedance of 140 ohms.

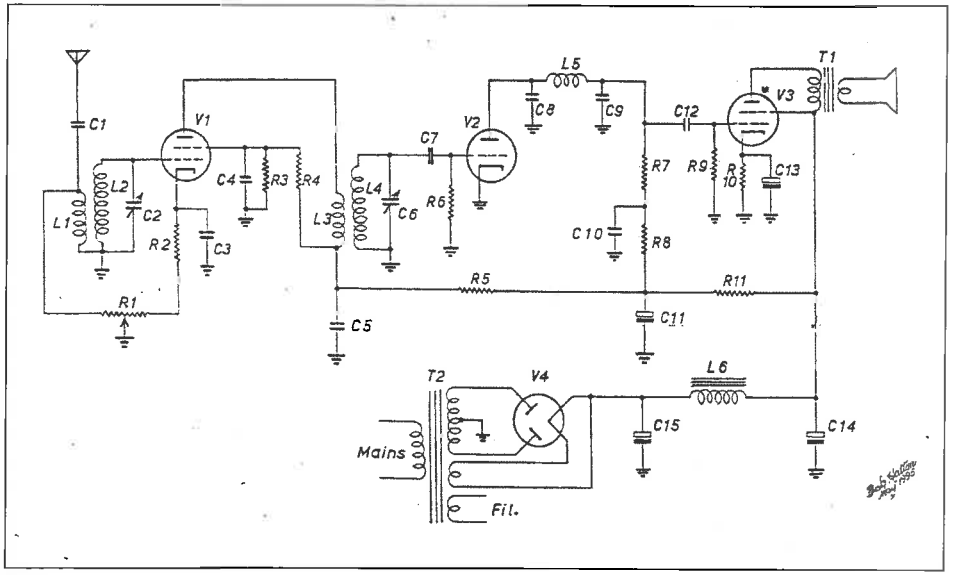
It must be considered that where C 15 is replaced with a capacitor which is very much larger than the ideal both the rectifier and the power transformer will be under strain. In an extreme case it will be a toss-up as to which will fail first. As the value of C15 is made larger it begins to look ever more like a short circuit as far as the rectifier is concerned.

In reply to the frequent question "Why can't I use 100 mfd here?", you can; provided some form of current limiting is used to protect the rectifier valve. It must be remembered that the higher the capacity at this point the higher output the voltage will be (there is a limit to this of course) and the higher the ripple current in the capacitor will be. The peak ripple current can exceed the HT current. Where the ideal value for C15, as per a valve manual, must be replaced with something larger, care must be taken to see that there is sufficient resistance in the supply circuitry. This can be done quite easily by measuring the voltage at C14 (with the receiver working) and inserting resistors in the anodes of the rectifier to bring the voltage down to what the original value of C15 provided. Alternatively, a resistance between the rectifier and C15 could be used. In each case the required resistance will be quite low; probably 200 ohms or less but as the component carries the ripple current as well as the HT current a suitable wattage rating may be higher than you expect.
As regards C15 in general, it needs to be a good component because it is working very hard. It needs to be able to stand the ripple current (heating) without stress if it is to have a decent working life and the working voltage needs to be considerably higher than the working voltage of the receiver. A safety margin of 100 volts or so is a good thing. Frequently these capacitors are marked with a working voltage and a surge voltage. For example- 450 volts working, 525 volts surge.

Peak working voltage is the peak coming off the rectifier and is 1.414 times that which a multimeter will measure on the valve anodes. So if the transformer provides, say, 350-0-350 at the T2 secondary, C15 should have a peak working voltage of at least 500. The surge voltage is usually between 75 and 100 volts above the recommended working voltage and is the point at which the capacitor is designed to have a high leakage. When this point is reached the leakage current makes the capacitor act as the lower section of a voltage divider, with the rectifier as the top section, and should stop the voltage rising above this point. Normal conditions are restored when the voltage drops. The old upright "wets" were very good at this (when they were new!) and served very well in the C15 position.

Such a condition would not be reached in an ordinary radio receiver although quite high voltages can be present where a directly heated rectifier is used with cathode type valves. As the rectifier heats almost instantly there can be a very high voltage on the HT line for the 10 or 15 seconds that the valve cathodes take to reach operating temperature and start drawing current.

L6. This is an iron cored filter choke which is a major smoothing component in the power supply. It forms a low-pass filter with C14 and C15 to take the hum off the HT line. In many cases the field coil of an electromagnetic speaker is found in this position and the smoothing action is combined with providing magnetism for the speaker pole piece. The operation of filter chokes is complex but, effectively, they resist the passage of AC while allowing DC to flow. The advantage of a choke is that it can be made with a relatively low DC resistance, compared with a resistor doing the same job. The disadvantages are size, weight and cost. Frequently a high wattage resistor can be found in this position. This makes it a "resistance-capacity filter" and C 14 may need to be larger.



TI. The audio output transformer, which should need little description. It matches the output valve impedance to the speaker, thereby ensuring maximum power transfer and best available audio volume. The size of this component is dependant mainly on the power it must handle and the amount of DC anode current taken by the output valve. The DC will tend to magnetise the transformer core and will saturate it completely if the transformer is too small or the anode current too large. This magnetisation reduces the amount of power the transformer can transfer and if saturation is reached on power peaks audio distortion will occur. The DC anode current tends to prevent the core responding to signal currents produced by the valve and thereby restricts the amount of signal that can be transferred to the speaker. The action is difficult to describe simply. The core will accept only so much magnetism and that which is taken up by the DC field cannot be used by the AC field. For this reason a replacement transformer should never be smaller than the original.

T2. The power transformer which modifies the mains power to whatever is suitable for the various circuits of the receiver. The total output load, consisting of the combined power requirements of the valve filaments and the HT line, governs the overall size of this component and they vary greatly. A 5 volt winding, with suitable amperage capacity, is provided for the rectifier filament. and a similar winding at 2.5 or 6.3 volts is provided for the valve filaments or heaters. HT requirements vary widely and depend on the number of valves to be supplied, the voltage requirement of the output stage and the voltage which will be dropped by the smoothing components. A speaker field magnet coil will commonly drop 100 volts and this must be added to whatever is required by the output stage. With some of the older valves, such as the type 50 needing up to 450 volts, the HT at the transformer could be very high. 385-0-385 was quite common and higher voltages can be found. Also, this voltage appears as DC on the rectifier filament so the insulation must be good here too.

Power transformers used in domestic receivers are generally designed to run intermittently. The heating effect of continuous operation may stress the insulation and cause liquification of compounds such as pitch or wax. Although some heating in such things is desirable to exclude moisture, prolonged operation should really be avoided.

Some Notes on Tuning Adjustments.

The ideal set up for tuning adjustments is to have both the coils and the capacitors adjustable within small limits. Tuning capacitors invariably have trimmer capacitors associated with then, either as an integral part or attached somewhere in the circuitry. Adjustable coils are not so common but the best will have some means of trimming the inductance. In lining up a set the manufacturer's instruction should be followed but if this is not available the inductances should be adjusted first. A RF signal at the low frequency end of the band (capacitors fully meshed) is fed to the aerial and the receiver tuned to it. The signal must be modulated, preferably with a single audio tone (400 Hz is comfortable to listen to) and should ideally come from a signal generator rather than a broadcast station. This allows control of the level of signal fed to the aerial and allows reduction of the level as the tuning is "peaked". Tuning can be done by listening to a broadcast station but it is rather difficult. A straight tone from a signal generator is very much better and easier to use. The inductances are adjusted for maximum audio output on the low frequency signal or a maximum closure of a magic eye if the set has one.

With the inductances trimmed for maximum output a signal is then tuned at the high frequency end of the band (capacitor plates unmeshed) and the capacitor trimmers adjusted for maximum output. All adjustments, low and high, are then rechecked. This may need to be done several times as the adjustments will interact to some extent. An optimum setting for everything will eventually be found. Where there is no means of adjusting the inductances and a manufacturer's instruction is not available, low frequency adjustments cannot be made. In this case a signal is tuned about 10% down from the top end of the band, the capacitor trimmers adjusted for maximum output and everything left at that.

ADMIRALTY PATTERN 66650 TUNER-AMPLIFIER B50

by Des Wright

The tuner-amplifier label takes us back to the early days of wireless when each function of a receiver was a separate assembly; tuner-detector-amplifier etc. The B50 is a normal superhet receiver. The physical layout and type of components suggest late 20 to early 30's era. These are large and solid and of high quality.

This is a large set 28 inches wide and 15inches high and deep. A panel label gives the weight at 94lbs and this is without the DC supply. The receiver is made to be fitted into a rack, so a few AB seamen would be needed to wrestle it into position.

Frequency coverage is 500kHz to 23 mHz in six ranges;

Valves used are-

VP4A RF & IF
NR51 Mixer
NR52 HFO & BFO
NR51 Detector
NR27 Audio

Reception modes are CW and AM.
Antenna inputs are for balanced feeder or single wire and output is to headphones. Power requirements are 230Vac for the filament transformer and 200Vdc at 70mA.

A panel label shows 1940 as a possible build date while some components are dated 1939. The fitting of R.I.S. (radar interference suppress) indicates the B50 was capable in WW2.

Tuning was not ganged; there are separate dials for the HFO, RF and Trap circuits.
Range change; left hand wheel changes coil turret for HFO and Traps. Right hand wheel controls the turret with the RF and Mixer inputs.

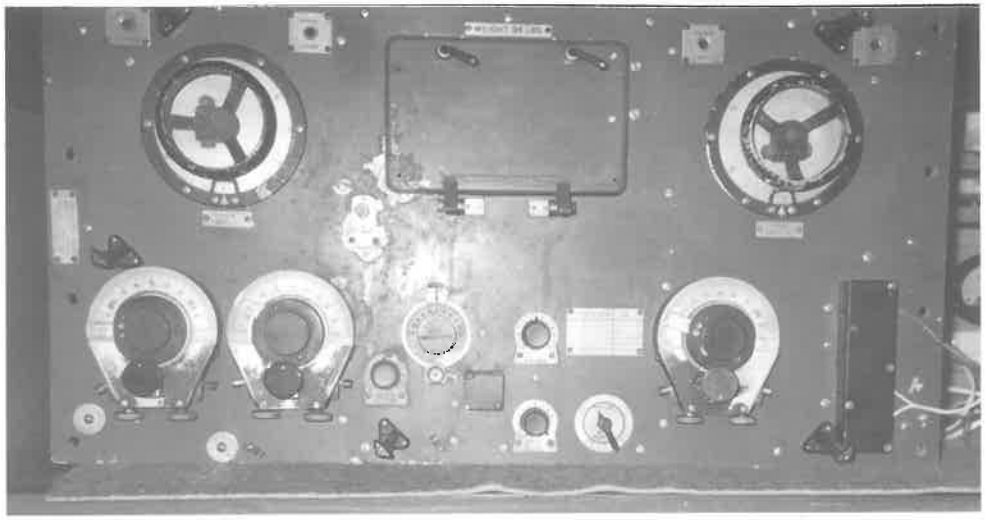
The dials are calibrated 0-100 over 180 degrees. Slow motion drive is provided which can be disengaged for direct drive for wide frequency change. Two click stop positions are available for quick return to preset frequencies.

Tuning requires setting the HFO to frequency and peaking the RF-Mixer tune, and keeping peaked up with frequency changes.

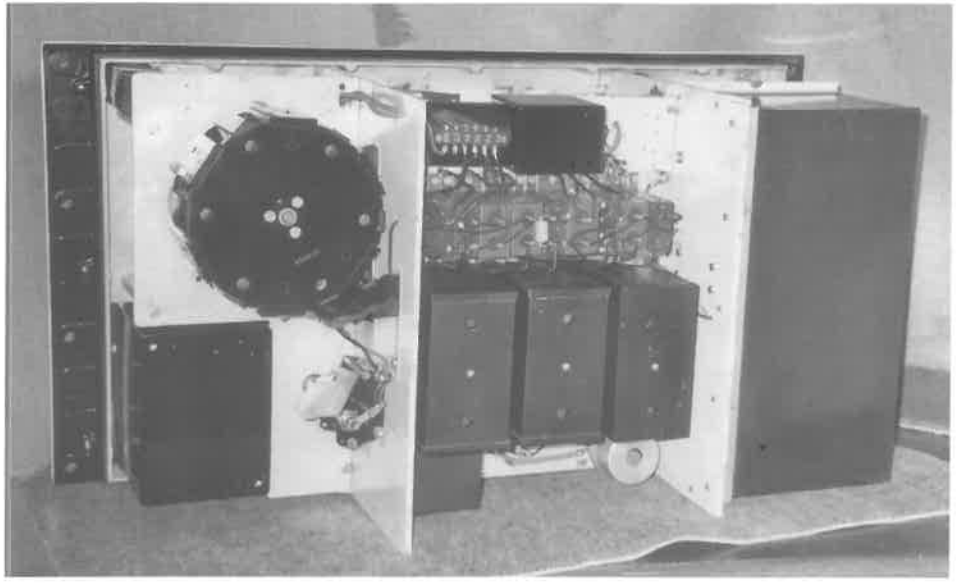
The IF frequency is 235kHz so correct tuning is important to minimise images. The trap circuit can be brought into use when images are troublesome. This is the third dial on the left side.

Other controls are RF gain, vernier fine tune, BFO switch, CW note filter and filament hum balance.

A basic circuit diagram is attached to the front of a door in the front panel which may be opened to give access to the valves and the resistance panel behind the valves. Note that the valves VP4A and NR51 have their anodes connected to the top caps, so mind fingers!



B50 front panel before and after refurbishment.



Rear view B50

Rear view shows on the left the coil turret for the RF and mixer stages with mixer tune capacitor below. RF stage components are on the opposite side of the partition. Filament transformer is below. Top centre are the audio transformers and below a bank of bypass capacitors. Next below are the IF transformers and BFO housings. At the bottom are the CW note filter components.

Extensive shielding has been employed to reduce oscillator radiation to a minimum to prevent interference between receivers in multi-receiver installations. At that time it was believed that enemy ships could pick up HFO emissions and locate shipping that way. This has not been proved.

To allow normal civilian use of the B50 a DC power supply, audio output stage, and speaker has been built into a small housing, audio gain control fitted in place of the redundant RIS control, AVC also fitted.

The audio stage plugs into the headphone socket so phones or speaker may be easily chosen.

The IF and audio transformers used see receiver audio response peaked broadly at 1000Hz and dropping gradually above and below this point. The CW note filter is tuned to 1000Hz giving overall excellent CW reception. As naval signals were always in CW the B50 fills the requirement well when in the hands of a skilled operator.

How does it perform? The following measurements for overall antenna to amplifier output.

Sensitivity- for 500mw, output, 30% modulation, 1kHz.

A.M.

Frequency	750 kHz	10uV
	1.6mHz	7.5uV
	5.0mHz	4.0uV
	10.0mHz	3.8uV

All ranges show over 20db S + N – N ratio.

C.W. Frequency 10mHz; 0.6uV for 500mw 20db S/N ratio.
Signals down to 0.2uV were easily copied.

Image ratio; At 1000kHz 55db dropping to 20db at 10kHz.

Paper capacitors are a frequent cause of failure due to insulation leakage. This B50 has been subject to dampness and poor storage but the paper caps have tested good, a tribute to the makers, Muirhead.
Resistors are Dubilier, ceramic tubes with moulded end caps: like the Centralab we know of old. These fit into fuse clips so may be easily replaced.

Restoration of this old receiver did require some hours work refinishing and getting everything working smoothly again.

Overall an interesting and unusual piece of radio history.

SERVICING HINTS

1. Many earlier valves get loose on their bases, I have found a good way to overcome this problem by using "heat shrink sleeving" slipped over the base and on to the glass envelope. Heat shrink sleeving is available from electrical wholesalers and some hardware shops, it usually come in one metre lengths and can be cut with ordinary scissors. Take your valve(s) along when purchasing the sleeving and use a 'heat gun' to shrink it, a hair drier does not get hot enough.

2. One of our members, Paul Burt of Christchurch, phone 03 - 960 7158; fax 03 – 981 4016, email: dawn.lloyd@paradise.net.nz, supplies 3 sizes of plain unprinted valve cartons. I have found these to be excellent for storing coils. One can write on the outside of the carton all the details of the coil i.e. connections, type, set which it was removed from etc.
See Paul's carton advert in "Available" near the back pages of this Bulletin (Ed)

I hope these two hints may be of benefit to some members.

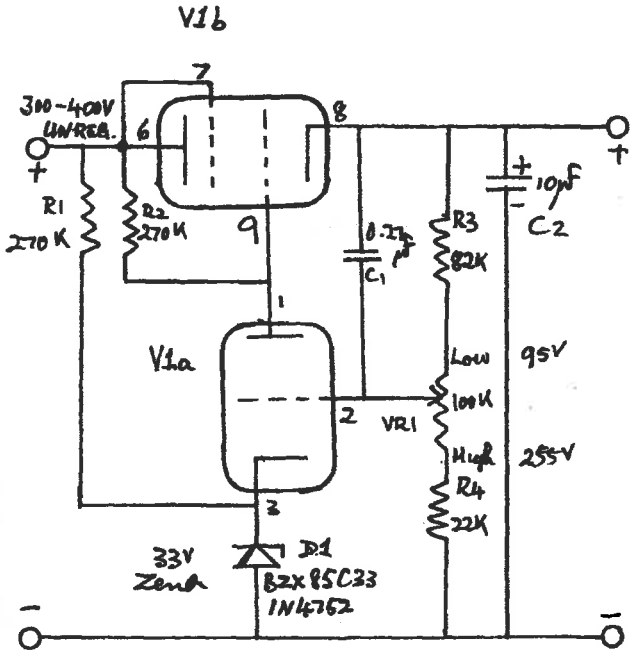
Murray Stevenson.

ANOTHER REGULATED POWER SUPPLY

Rodney Champness VK3UG

In November 2006 issue of the *Bulletin* two regulated power supplies were described by John Walker ZL3IB. I use a design similar to the simpler of the two supplies.

I originally saw a design like this in an early Yaesu transmitter, which used a ECL82/6BM8. Whilst the ECL82 does a satisfactory job, the use of a ECL85/6GV8 will do an even better job. The ECL85 is a valve, which will draw more current for the same voltage drop across the valve or will drop less voltage across it for the same current when compared to the ECL82. It also has an advantage in that if only up to around 220 volts output is required the heater can be run from a filament winding with one side earthed, as the heater cathode voltage rating of the ECL85 is 220 volts. The heater cathode voltage rating of the ECL82 is only 100 volts. However, these rating must be rather liberal as the Yaesu mentioned above had an output of 150 volts which exceeded the heater cathode voltage rating of the valve. With the heater winding floating as in John's article this rating is not important, although it would then be a good idea to strap one side of the heater and the cathode together.



As can be seen, my regulator circuit is even simpler than John's and it does work well with no problems in any units I've built. I have used the NE2 neon as a reference as well as a zener diode in one case. With the ECL85 up to 70 ma can be drawn in some circumstances, providing the total dissipation does not exceed around 10 watts. This exceeds the ratings for vertical output service but is okay in this particular task. The output voltage drops by under 2% when a 45 ma load is attached.

REGULATOR CIRCUIT : V1a is a ECL85 and V1b is a 6GV8

If a slightly different regulated output voltage range is required the resistors R3 and R4 can be altered. The lowest voltage can be reduced further, by lowering the value of R3 and the highest output voltage can be raised by increasing R4. These values do inter-react to some extent. Some may wonder what C1 does. Its purpose is to feed any output ripple to the grid of V1a which through the action of V1a causes V1b to counteract the ripple. This is a form of dynamic filtering. A valve taken out of a black and white TV set is usually still quite suitable for this task, although a new one may be better still.

LETTERS TO THE EDITOR

HELP SOUGHT

I bought the above Ultimate set last year and had to strip the cabinet completely as it was painted brown all over. The chassis (pictured above) doesn't look like the original one as the spacing of the knobs are not matching (the cabinet had extra holes drilled). The dial fits perfectly though. The only markings on the chassis are the numbers 6CN 8268. The speaker cloth is certainly not original but I had nothing to replace it with so I'll leave it as is for the moment.

Wolfgang Thiel. Tel: 09-476 2191
Email: wolft@xtra.co.nz

SOUTHERN REVIVAL

In the latter part of 2005 the Christchurch branch managed to gather quite a few local members together to run a couple of meetings, using the Christchurch West Amateur Radio club rooms at Riccarton. After a further three successful gatherings during the following year, Jim Lovell, David Chapple and Albert Smith were asked to form a steering committee and we would see to a possible AGM in March 2007.

Well this has worked out just dandy, and seeing things were running so smoothly, it only seemed natural to vote these lads at the helm, back in to be our committee during 2007/08. A Kiwi Bank account had been opened previously and now shows a surprisingly high return, despite only a gold coin being requested to help out with the supper side of the programme. VRS types must be naturally generous by nature.

Meetings usually rally between ten and fifteen members and there will be a set theme for the evening, our last effort covering the rugged little Bell Colts of Paul Burt's collection. Needless to say, the more recent branch members were pleasantly surprised to find to find out there have been changes made "under the bonnet" over the years and it was not such a boring little machine after all, especially when they came in a bright red cabinet.

So the Christchurch branch is away to a healthy restart and we intend to be regular in reporting our progress within the pages of the Bulletin.

Pete Ingram
19 March 2007

See page 1 of this Bulletin for the Christchurch Group's contact details and the NZVRS website for updates of their meetings (Ed).