FROM THE LIBRARY

The following are titles and key points from articles published in other vintage radio magazines received by the NZVRS Library. Photocopies of these articles are available to members at $1 each from our Librarian, Ernie Hakanson, 17 Williamson Ave, Grey Lynn, Auckland Ph 09/3766059

857 Build a Wobbulator! Small unit using semiconductors for use with an oscilloscope. 9V battery operation. BVWS Bulletin, Autumn 2004. p22

858 The ARB Receiver. US Navy receiver covering 195kHz to 9050kHz. Photos. Schematic, description. HRSA Radio Waves Oct 2004, p20

859 Development of Radios in the Flying Doctor Service (part 2). Description with photos. HRSA Radio Waves Oct 2004, p28

860 Philips model 115. Photo, description, schematic, restoration details. HRSA Radio Waves Oct 2004, p36

861 Dorchester Beam Station. Description, history, photos working conditions. Radio Bygones, Oct/Nov 2004, p10

862 Plan Sussex 1944. The British/American/Free French operation to support the Normandy campaign. Description, photos, schematics. Radio Bygones, Oct/Nov 2004, p12

863 Restoring a Bush DAC10. Photos, schematic, description. Radio Bygones, Oct/Nov 2004, p20

864 A Question of Accuracy. The Rohdes and Schwarz frequency and time set type CAQ. Photos, description. Radio Bygones, Oct/Nov 2004, p26

865 The Bell Colt (part 2). Restoring the chassis. Diagrams, description. Wellington Vintage Radio Newsletter, Sept 2004.

866 The Bell Colt (part 3). Schematic, faults. Wellington Vintage Radio Newsletter, Oct 2004.

867 Class A Imagineering. Part 6 of a series of articles on audible improvements claimed for class A operation. Electronics World, Nov 2004, p10

868 Andrea. Model 1-A-5. A 1934 USA radio. Photos, description, circuit diagram. BVWS Bulletin, winter 2004, p4.

869 The Amplion Dragon Wooden Flare Horn loudspeaker. Photos, full restoration details including making wooden flare, rewinding coils etc. BVWS Bulletin, winter 2004, p13

870 Compact Receiver design from Valve to Transistor - part 1. History, photos and some details. BVWS Bulletin, winter 2004, p26

871 Radio Acoustic Products in Jersey. 1946 - 1950s. photos, history. BVWS Bulletin, winter 2004, p38

872 The Alexandra Palace Story. History with photos of world's first public electronic TV service. BVWS Bulletin, winter 2004, p42

873 EKCO Clock Radios. Review with photos and history. BVWS Bulletin, winter 2004, p49

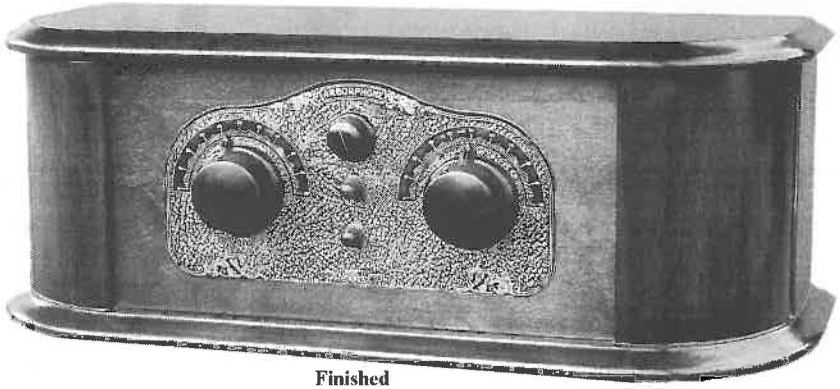
874 South Dorset wireless makers in the 1920s. photos with circuit diagrams and descriptions of sets made there. BVWS Bulletin, winter 2004, p54

875 The RAF Signals Museum, Henlow. Extensive coverage of exhibits with many photos and some descriptions. Radio Bygones, Christmas 2004. p6

NZVRS BULLETIN

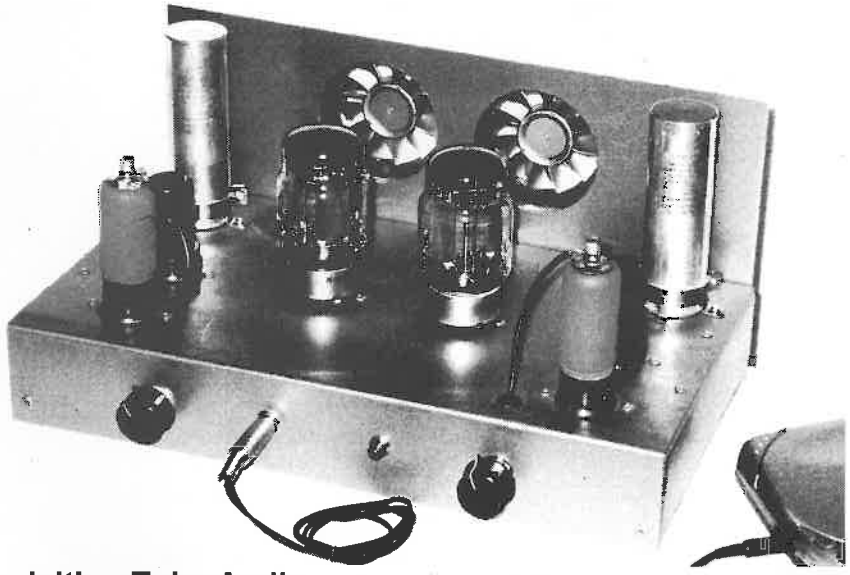
Vol 26 No. 2 **May. 2005**

NEW ZEALAND VINTAGE RADIO SOCIETY



Finished

Refinishing Radio Cabinets



Revisiting Tube Audio

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 1006.
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Financial and membership matters are handled by the Treasurer. A list of members is available on application to the Treasurer with a self-addressed, stamped envelope.
Please address all NZVRS monies to P.O. Box 13 873, Onehunga, Auckland 1006, N.Z.

LIBRARIAN, Ernie Hakanson, 17 Williamson Ave, Grey Lynn, Auckland. Ph 09/376 6059. Requests for circuit diagrams, books and magazines (for personal use only) are handled by the Librarian at a small charge. Back numbers of most NZVRS bulletins are also available from the Librarian at $3.00 each for Vols 1 to 10 and $4.00 for issues from Vol 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 should be sent to the
EDITOR,
Reg Motion, 2A Hazel Terrace, Tauranga.
07/576 8733, email: regmotion@xtra.co.nz

AUCKLAND MEETINGS will be held at the Horticultural Society Hall, 990 Great North Rd. (opposite Motion's Rd.).
Mon. May 16 at 7.30pm. Metal cabinet sets (any age)
Mon. June 20 at 7.30pm. Auction
Mon. July 18 at 7.30pm. Talk on Electric Organs.

BAY OF PLENTY AREA MEETING
This meeting will be held at a time and place to be advised.

TARANAKI AREA MEETING
Our meetings 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, 06/7532475 or Graeme Lea, 06/7585344 for further details.
Note : Due to unforeseen circumstances there will be no Taranaki Radio Weekend this year.

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. 04/472 8788.

CHRISTCHURCH MEETINGS.
For details of meetings contact Jim Lovell, 41 Yardley St, Avonhead, Christchurch 8004.
Ph 03/342 7760

ITEMS AVAILABLE TO NZ MEMBERS

Please make out cheques to New Zealand Vintage Radio Society

From NZVRS Secretary, 2 Levy Road, Glen Eden, Auckland.
paul.woodcock@opus.co.nz

10m lengths of 3 core Power Cable
$8 per length plus $4 P&P
Ivory 3 pin Power Plugs
$1 each plus $2 P&P for up to 4 plugs.
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$5 each plus 50c P&P

From NZVRS, P.O. Box 13873, Onehunga, Auckland 1006.
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Residual Current Detectors
$20 + $5 P&P
10uF 450V, Black, Polarised, Axial lead, Electrolytic Capacitors.
$1.00 each plus $2 P&P
Limited to 20 per member (larger quantities can be placed on back-order)
22uF 450V, 85oC rating capacitors
$1.50 each plus P&P
or 12 for $20 - P&P inclusive.
Dial Lamps, 6.3V, 0.15A, #40 screw & #47 bayonet. 50c eac plus $1 P&P
Tight Woven Nylon Dial Cord, 0.7mm diameter - suitable for almost all radios
10 meter lengths at $5 including P&P

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FROM THE EDITOR

It is most encouraging to note the increase in our membership (see our Treasurer's report overleaf). However, with it comes the realization that the grim reaper is rapidly decreasing the number of our members who have an intimate knowledge of valved radio restoration. There is a need for some basic articles on restoration.
To this end Rod Osborne has produced an article for this issue which explains how to go about cabinet restoration and Peter Lankshear is updating a series of 14 articles on "Radio Servicing for Beginners" which he authored and we published 18 years ago. I propose, if practicable, to reprint all 14 in our next bulletin.

CONTENTS

FROM OUR TREASURER

AGM Report - There was no change to our elected officers. The financial report, included with this bulletin, shows a cash profit of $2955.95 (exceptional!) for the year. Membership grew 4% over the last year - and nearly 6% over the past three years! A great result.

We have acquired a VHS Video tape **"Empire of the Air"** - the men who made (American) radio - Lee De Forest, Edwin Howard Armstrong & David Sarnoff.
A 2 hour long interesting view into the background of these contemporaries and their impact on the development of radio - especially in USA.
This tape is available on loan to regional groups of 5 or more members on request; email The treasurer.

The library has received Volume 4 of the series **"Wireless for the Warrior"** by Louise Meulstee & Rudolf F. Staritz. This volume covers "Clandestine Radio" - not only 'spy equipment' but sets used by Special Forces, Partisans, Resistance, 'Stay Behind' organisations, Diplomatic Service, Australian Coast Watchers, RDF and intercept receivers, bugs and radar beacons.
The information has been compiled through the collaboration of a vast number of collectors and enthusiasts around the world. It's 692 pages in Hardback format includes information on more than 230 sets and ancillaries. There are over 850 photographs, 360 line drawings and 440 data tables.

Also we will be placing orders for **Tickling the Crystal (Vols 1, 2 & 3)** covering domestic British crystal sets of the 1920s. Written by Ian L. Sanders with photography by Carl Glover, Tickling the Crystal is the first book, dedicated to the topic of British crystal sets, to be published in the last 25 years. For a very brief period during the early 1920s, these simple receivers played a crucial role in the expansion of domestic wireless throughout the United Kingdom. For many families, rich and poor, the crystal set provided an introduction to the new pastime of listening-in to broadcast radio programmes. Rapidly made obsolete by competition from more sophisticated valve receivers, the humble crystal set virtually disappeared from homes as suddenly as it had arrived, but not without leaving its mark on the history of wireless.
Written by a long-time authority and enthusiast, Tickling the Crystal is the most comprehensive work on the subject ever assembled. Containing almost two hundred photographs and a wealth of previously unpublished material, it cannot fail to be an invaluable reference for anyone interested in the history of early wireless receivers. It should appeal to the experienced collector and novice alike. 256 pages A4 format.
Note that there are now three volumes of this book.
Landed price for members will be about $85+ per volume. The NZVRS order is to be placed 16 May, delivery takes about 4 months for reduced surface postage.rate. Contact me if you want to be included.

Cabinet Refinishing

Rod Osborne

Many collectors when finding an old radio have an urge to restore it. I suggest you resist this urge, but if you can't, then the following may be of help.

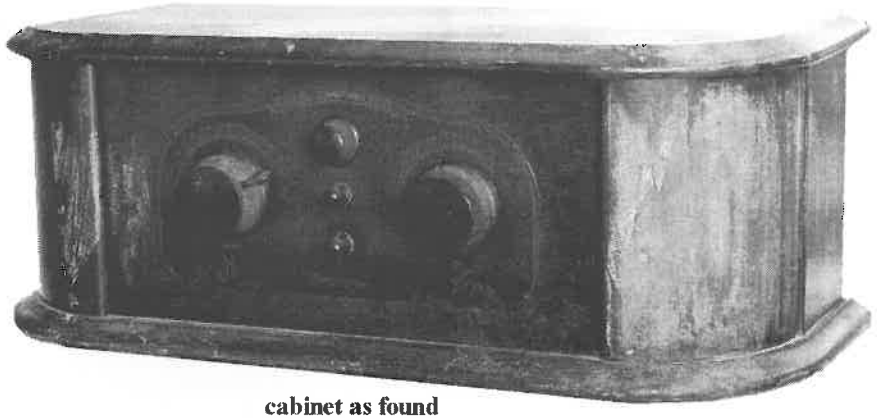
There have been quite a few articles on restoring the chassis but I would like to offer some suggestions about restoring the cabinet – something I feel that is going to have far more effect on the final appearance of the radio than the chassis restoration and something which will involve vastly different skills and cost just a little.

The radio I have chosen to illustrate this article did not fall into the restore category. It is an Arborphone model 27, a simple 5 valve (201A's) TRF and was made in 1927 by Precision Products, Ann Arbor, Michigan. The cost then was $90.00. The entrepreneurial drive behind Arborphone came from Charles Verschoor, who started manufacturing in the great depression years. He soon realized that customers would pay more for sets with extra valves so he bought out a 10 valve radio. He just forgot to mention that five of the valves didn't actually do anything except light up. The firm filed for bankruptcy in 1929!

To strip or not to strip?

Whether to strip the cabinet or restore the existing finish is something that only you can decide. My basic thought is to restore the existing finish if at all possible and my criteria is "would I be proud to put the finished radio in my collection or lounge". If the answer is yes, then restore.

As can be seen from the "before" photo below, this radio's finish had deteriorated to the stage where the little bit of polish that was left could be easily scraped off with the fingernail and some areas were rubbed down to bare wood, so my decision was to strip and start again.



cabinet as found

Stripping

There are many paint and varnish strippers available in the market. Some good and some not so good. A few years ago Gerry Billman and I conducted a test of four of them. Two required 3 separate coats and a lot of elbow grease – one required 2 coats and one required only one coat. The best one for us at that time was Mirortone stripper. It had the slight disadvantage that being a professional line it could only be bought in four litre cans. As we were doing a lot of stripping at the time, that wasn't a problem.

More recently, I had run out of stripper and had a small job to do, so went to Mitre 10 and bought a can of "Dads Easy Spray" on a friend's recommendation. This came in a one litre can and was complete with a spray bottle. The theory was that you filled the spray bottle and just sprayed it on. That may have been the theory but in practice it was a bit of a joke. The spray nozzle kept blocking necessitating continual messy clean up attempts. I finished up just tipping the stripper into a container and brushing it on as normal. To my pleasant surprise it then worked excellently. It was much easier to keep the surface wet with this stripper than any other I have used.

There are several important points to watch when stripping:

1. Cover up all exposed body parts. This means long trousers, long sleeved shirt, rubber gloves and protection for eyes and face. Stripper is a highly corrosive substance and can be easily splashed in use. (You will look like a bit of a nana dressed like this but it is worth it)
2. Read the instructions fully.
3. Use in a well ventilated place as the fumes are quite toxic.
4. Select a shady place out of direct sunlight.
5. Keep a large bucket of warm soapy water handy.

To use, pour the stripper into a container and liberally paint onto the surface to be stripped. You will need to keep the surface very wet which means don't be stingy with the stripper. Depending on the type of the original finish you will need to keep the surface wet for anything from five to fifteen minutes. Just keep working the surface with the brush and adding stripper, until all the old finish is dissolved.

stripper applied

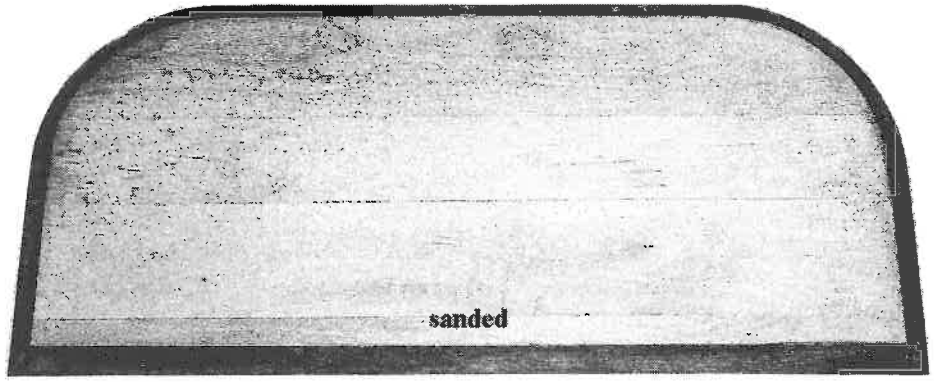
At this stage quickly wipe off all the stripper and gunk with paper towels, and then using a Scotch Brite pad and plenty of warm soapy water clean off all the rest of the stripper. (These Scotch Brite pads are available in much bigger sizes and much cheaper from a wholesale cleaning or paint supply merchant than the supermarket). Then rinse with a clean cloth and clean water and immediately dry with a soft cloth. Try and keep the timber wet for as short a time as possible to prevent swelling.

As the wood is still quite damp it needs to be left to dry thoroughly in an airy place, but out of any direct sun. One very experienced member uses a water blaster to clean the stripper off the cabinet but I think it would be better if you stick to manual cleaning!!

Sanding

When the cabinet is completely dry (usually the next day) it is time for the very important job of sanding. The type of sanding is determined by the cabinet finish. If the wood is solid (as was my cabinet) then sanding can be quite vigorous. If the finish is a veneered one then much more care is necessary. Some veneers are quite thin and delicate so hand sand them starting off with a 240 grade paper and then reduce to a 320 and then a 400 grade for the final very smooth finish. Be very careful of the edges of the cabinet as they are very easy to over-sand and wear right through the veneer.

While sanding, if you want to know how the finish will look when finally polished, wet a soft cloth with turps and rub it on. The wet area will look approximately the same as when finished and will enable you to see if there are any sanding marks or imperfections that need further work. For solid timber cabinets I use an orbital electric sander on all the flat surfaces and just hand sand the edges and curved places.



When doing these projects I usually select a piece of timber from my offcuts box that has approximately the same grain and colour as the cabinet wood. I sand this and prepare it the same as the cabinet. This is then used for testing various stains and finishes before applying them to the cabinet. More of this later.

Staining (if needed)

Once the cabinet is sanded and checked it may need staining. Some of the early cabinets, particularly the high end ones with lovely figured walnut or mahogany veneers, were just filled and polished and left their natural colour. Many of the lower cost ones used lower grade wood (you can see this type of timber in the above picture) and were heavily stained to a dark colour to hide their imperfections.

The stains I use are either turpentine or spirit based. The one you will use is determined by the type of timber, the amount of colouring needed and the type of finish to be used.
If you have, say, an oak cabinet and wish to make it a richer and a more even colour then one of the spirit based stains is ideal as these are fairly transparent. (Possibly golden oak)
Similarly, if you have a dull mahogany timber it could be enhanced with one of the rich mahogany stains.

All of the above types of stains were too subtle for my cabinet. Because of the type of timber it needed a dense stain, to hide the variations in the wood, but one that will still allow any of the nice areas of grain to show through. There is one stain that I have found ideal for this. It is a turpentine based one made by Wattyl and called "Interior Wood Stain Colorwood". It comes in many shades but I just buy Charcoal, Brown and Mahogany and mix them to make all the shades I have ever needed. It is available in small tins and seems to last forever. It is also great for highlighting the dark edge grain of timber, such as found round the base and tops of cabinets.

For my cabinet I mixed half Charcoal and half Brown. After testing on my test piece of wood I applied it to the cabinet. Apply the stain, in a good thick coat, with a brush. Then, using a soft cloth, rub the surface until it is nice and even and the desired depth of colour. If you rub too much off, simply apply more stain and start again. It is very forgiving. (The variations shown in the picture are caused by the lighting, not the stain).

Pre- finishing

If you are working with a relatively porous grained timber such as mahogany or walnut, and want a finish to match the professionals, then it will need to be grain filled. This is a process whereby a filler is worked into the timber to fill all the variations in the grain and all imperfections and then wiped and sanded off. This is probably a bit beyond the scope of this article but if anyone wants to give it a try I would suggest mirrorfill available from specialty paint stores. Failing that, many of the old tradesmen simply used whiting as a grain filler.

Finishing coats

There are a great many types of finishes available to the home restorer. They include shellac, polyurethane, varnishes, oils, gels and lacquer.
Of these, only two, shellac and lacquer, were used to any extent from the 1920's. From the 1930's lacquer had virtually taken over as the finish for radios as it was more durable than shellac and was not easily damaged by water and alcohol.
If you wish to know the type of finish on your radio just dip a cloth in denatured alcohol and rub the finish in an inconspicuous place. If the finish starts to dissolve, it's shellac.

Shellac. (French polish)

This was the finish of choice for craftsmen in Victorian times and is still popular today. Shellac is a natural resin secreted by tiny Lac insects that live on the Lac trees of India and Thailand. These tiny insects form colonies of such vast numbers that the Lac shell can cover virtually the whole tree. It is gathered and stored as golden flakes.
Shellac can be applied by rubbing it on the timber with a cloth pad, or by brushing. The rubbing method was used to produce that beautiful finish seen on top class pianos and furniture. This method requires a great deal of skill and time and because of this was not used on production radio cabinets. This can be appreciated when it is remembered that the Atwater Kent factory, in its heyday, produced a radio every 12 seconds!
Shellac can be purchased in flakes or in ready mixed cans. The flakes are mixed 150gms with 500mls Methylated spirits then left to stand overnight and strained. Because this mixture dries quickly, it is quite difficult to avoid lap marks on the finish. I mix about 10% thinner retarder to slow the drying time slightly. The ready mixed shellac often contains a retarder.

To obtain a nice finish the surface needs to be rubbed down after every one or two coats and this is done with 400 grade abrasive paper or 0000 grade steel wool. Purchase a top quality steel wool such as Liberon or Briwax brands and a good quality no-fill abrasive paper, as the cheap ones will disappoint. I always apply at least 6 coats of shellac and sometimes apply 20 or more if I get carried away with enthusiasm.
I used Shellac to finish this cabinet as I felt it was something that was readily available to all and didn't require any special equipment.

Polyurethane and varnish.

These have not been a favoured finish for radio restorers and I think this has been because of their tendency to yellow with age and spoil the look of the timber. There are now formulas claimed to be non-yellowing, including some in spray cans, so maybe they need a second chance. (But not by me)

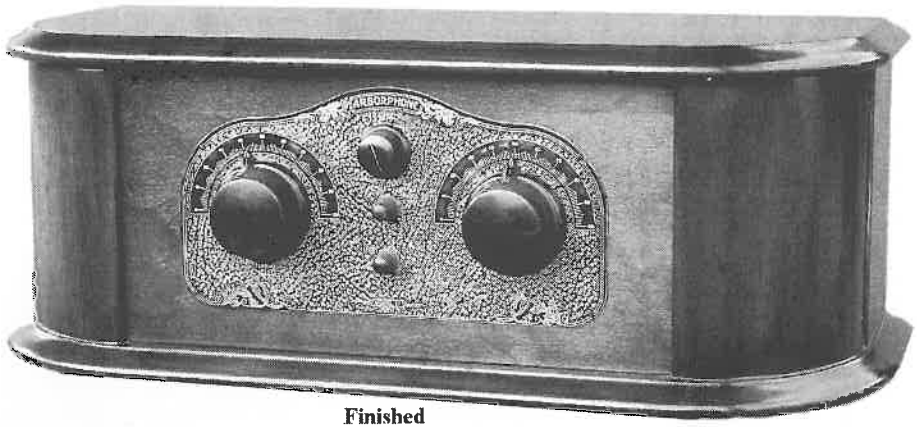
Oils.

These come in various types such as Danish Oil, Teak Oil, etc. Unlike varnishes that coat the surface, oil penetrates the wood without leaving a film to hold brush marks or other surface blemishes. This makes oils very easy to use but not suitable for me as I like the radio cabinet finish to have some depth to it and more closely resemble its original finish. Sometimes these oils can be used affectively as a restorer for dull cabinets. I used some Danish oil on a sad old Philco and it came up like new.

Lacquers.

This has been a popular wood finish for decades as it forms a hard coating and is resistant to heat and moisture. Its disadvantage for the home restorer is that it must be sprayed on. If you have a compressor and gun then lacquer is probably the choice for you. It dries very quickly and as subsequent coats partially dissolve the previous coat there is no separation between coats. It comes in various gloss percentages - 10%, 20%, 30%, 40%, 50% and full gloss. I find that 30% gives a nice satin finish. There are some relatively new pre-catalyzed lacquers available (Mirocat 3220 is one very good one). These lacquers need no sealer and are easy to apply. Most of them must be purchased in 4 liter cans and it is also preferable to use the proper thinner, so it is fairly costly to set up but the results are great and 4 liters does several cabinets.

Whatever product is used, I always finish with a couple of coats of good quality wax. The first coat I apply by vigorously rubbing with 0000 steel wool, to remove any small dust particles and blemishes. My favourite wax for the last polish is Briwax. This dries very quickly so only do a small area at a time.



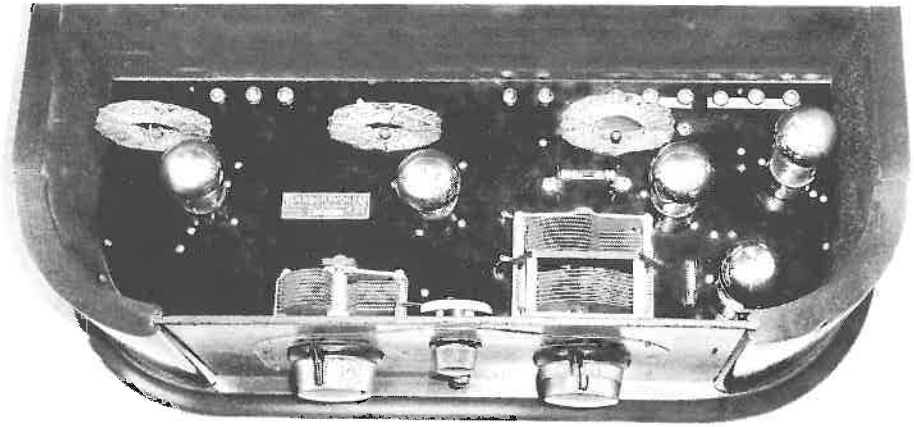
Finished

Costs

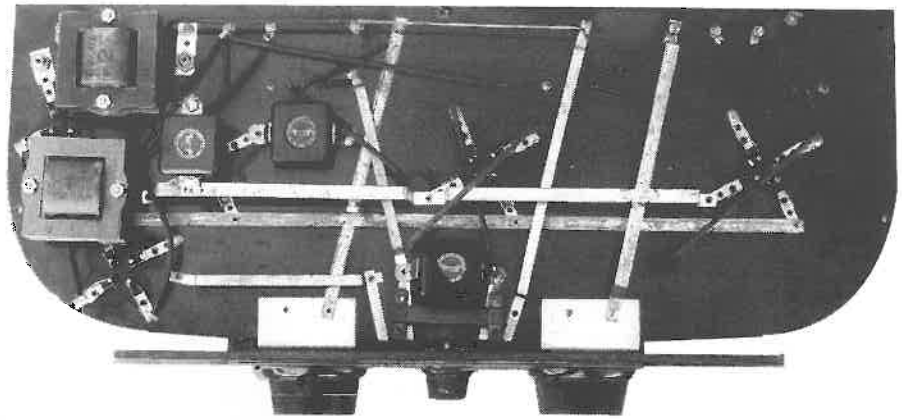
It is difficult to work out the exact cost of a restoration as once you have some stripper, brushes, sandpaper, wire wool, stain, shellac or some other finish, you can do several restorations without further purchases. I would suggest an approximate cost of $25.00 for a small cabinet like this one.
I recently asked a professional restorer for a price to lacquer a small mantel cabinet and he quoted $275, so DIY is the way to go unless you are planning to win lotto.

The Chassis

For the technical minded here are a couple of pictures of the chassis. The top view shows the five 01A's, the three Ferris wheel RF coils (still good), the tuning capacitors, the grid leak (slightly high in value but still good) and the rheostat volume control (still good).



The underneath view shows the moulded mica capacitors (still good), the 2 audio transformers (one good) and the wide use of riveted strap wiring.
Some appliance manufacturers have now started giving a 5 year warranty on their products but it would appear that Arborphone, with the exception of one audio transformer, could have given a 75 year warranty. The valves were made by RCA, not Arborphone.



If any member, with internet access, would like to see the photos in colour, I have posted them on my website. http://homepages.ihug.co.nz/~rod1

General purpose HT/LT power supplies

John R L Walker

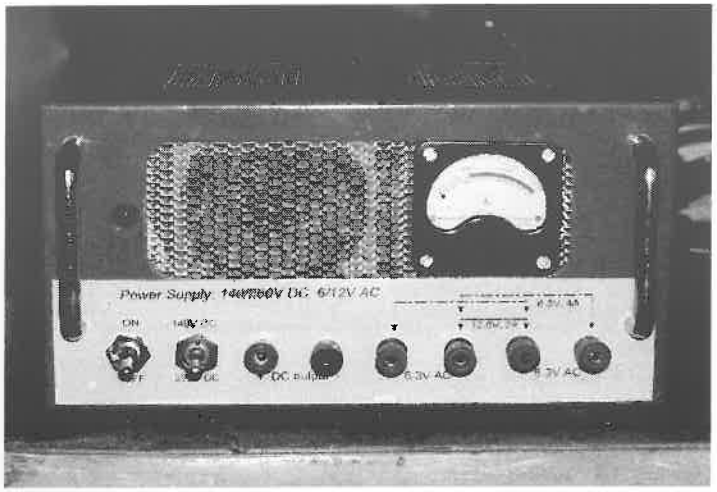
A general purpose power supply capable of providing HT+ voltages around 150V and/or 250V, plus filament supplies of 6.3 or 12.6V AC, is a useful asset for anyone servicing or restoring old valve receivers. In my workshop I needed such a PSU for operating communication receivers, like the venerable HRO, CSR-5, etc, which required an independent external power supply.

These receivers required a reasonably hefty supply capable of delivering at least 120+ mA HT and up to 6.3V at 4A or 12.6V at 2A. Luckily I had several ex-black and white TV power transformers in No.2 store (= junk box) which had a 106V secondary winding, two heavy current 6.3V windings plus a third low current 6.3V winding for the picture tube so these were ideal for my requirements. The choke (Ch1) also came from an old B&W TV.

Figure 1 shows the circuit which allows the HT supply to be switched between a bridge rectifier circuit to give a "Low" HT, somewhere between 120 –150V DC, or to a full-wave voltage doubler to give a "High" HT between 230 –260V DC. Similarly the two 6.3V windings can be connected in series or parallel to give a 6.3V 4A or 12.6V 2A filament supply whilst the low-current 6.3V picture tube winding was used for a pilot light. The whole unit was built into a metal case from a junked Pye "Karphone". The photo shows the connectors on the front panel but for convenience when powering the communications receivers I also took them out to an octal socket on the back panel.

A similar dual-voltage HT supply can be achieved with a power transformer with a centre-tapped secondary by using the circuit shown in Figure 2. In this case the "Low" voltage output uses a conventional full-wave rectification circuit whilst a "High" voltage output can be obtained by using the whole of the transformer's secondary winding connected in a bridge circuit.

Part values are not critical but must be adequate for voltage and current ratings of the transformer. In both circuit configurations do ensure that the voltage and current ratings of all components are adequate. It is also most important that capacitor C1 of the voltage-doubling circuit be well-insulated from the chassis. R3 is a 10W unit and serves as a bleeder resistor to stabilise the output and discharge the capacitors when switched off



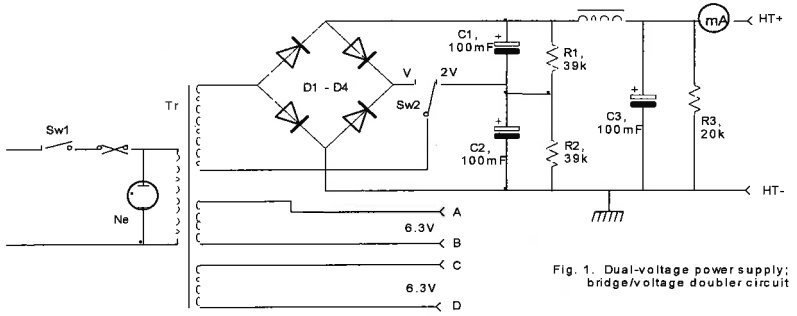


Fig. 1. Dual-voltage power supply; bridge/voltage doubler circuit

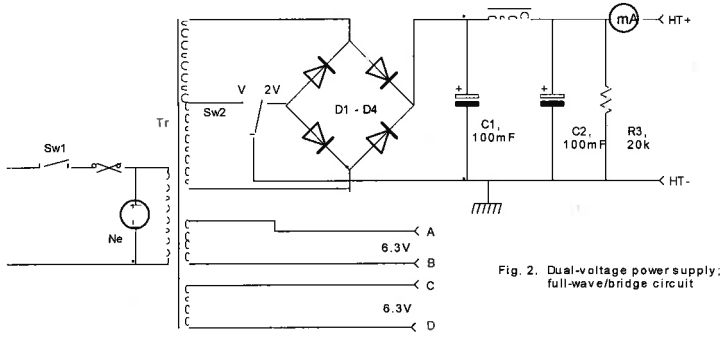


Fig. 2. Dual-voltage power supply; full-wave/bridge circuit

Parts list

C1, C2, C3	**100mF, 350 VDC wkg**
R1, R2	**39k, 5W**
R3	**20k, 10W**
D1-4	**Bridge rectifier or separate diodes; 600 , peak inverse volts.**
Tr	**See text**
Ch1	**See text**
Ne	**Neon pilot lamp (or use third 6.3V winding if available).**
Sw1	**Power on/off**
Sw2	**SPDT, Hi/Lo output voltage**

ADVENTURES OF A TRAVELLING RADIOMAN - part 4

In early 1951 Bill Heinz, as a junior radio technician stationed in Christchurch went to Mt. Cook with a senior technician to install the Alpine Emergency Radio Service. This service based at 'The Hermitage' was to provide radio communication to Gardner and Haast huts high on the slopes of Mt Cook. The Hooker Hut at the gateway to the Copland Pass and the Malte Brun Hut, high up the Tasman Glacier to provide for ascents in that area.

The service was at medium high frequency and the considerably large custom-built base station was housed in a Ministry Of Work's hut located together with the long sturdy 3-wire folded dipole antenna on the hillside at the rear of the hotel. Once the base was installed the Senior Technician headed off with mountain guides to install the four outstations leaving Bill to do the finishing off work and to man the equipment as each hut had its radio circuit commissioned.

The alpine hut radios had a battery operated receiver and a transmitter powered by a heavy war-surplus hand driven electric generator.

Bill continues with further excerpts from his memoirs:

It was an idyllic installation job, at a luxury tourist resort in the midst of some of the best scenery in New Zealand. One could never get tired of looking up to Mt Cook, so close it seemed with its white snow against blue sky and gleaming black rock. To the extreme left were the towering Mt Sefton and the Footstool, always seeming ready to topple and engulf the valley in which we were. Once my chores were finished I had time to enjoy the situation. I became an honorary mountain guide and assisted the regular guide with the tourist trips on the Tasman glacier. I was already an experienced mountain pass tramper having criss-crossed the Southern Alps over four different mountain passes on private trips the previous few years. However pretending to be a professional was then quite a thrill to me

Following the installation work was the yearly maintenance trips to service the system. This was my job for the next nine years: one week in the winter for base maintenance and three weeks each November/December for the entire system. Two paid holidays each year as the work was not arduous and there was ice skating under floodlights in the winter evenings and socialising in the hotel with the tourists and the mountain guides; it did not even affect my annual leave entitlement. Then there was the tramping, that arduous footslogging with a heavy pack that contained tools and test equipment as well as personal gear. Keeping up with the mountain guide, it took all day to reach three of the huts. Seventeen miles of tramping up the ever increasing slope of the Tasman Glacier. A four thousand foot climb up the steep Haast ridge at one thousand feet per hour and me straight off the streets of Christchurch. It certainly tested my stamina.

However this was almost winter conditions and our radio trips were usually the first in the season to the three high huts. This often entailed digging our way in to the precariously perched Haast and Gardner huts. Although it was not mountain climbing it still called for the same skills, crampons (spiked boot-add-ons), rock climbing, ice axe and belaying skills were required. If I had not learned them before I certainly learnt them quickly. In the dangerous spots we would be roped together and if that rope was not kept taut or off the ground I was told in no uncertain terms.

One soon forgot the trivialities of daily city life in favour of self preservation and care of your climbing companion. It was HOLD, and that belay had to be put on as a reflex action; one plunged the ice axe deep into the snow, wrapped two turns of rope around it and held on. Or, RUN and it was every man for himself.

I was saved from the jaws of a Tasman Glacier crevasse by a timely belay. I was third man in a roped party of three guides when I crashed up to my waist through a snow bridge. In trying to extricate myself, some of the frozen snow broke away from around me, I looked down into the eerie green light of this fifty foot deep tapering slot. One boot was on a projecting knob of ice but the other just dangled. That knob had saved me from swinging wholly within the crevasse on the end of the mountaineering rope. On another incident one guide and I, roped together, were doing quite a high traverse virtually on the side of Mt Cook; he had been constantly thrusting his ice axe up to its hilt into the snow when on the last occasion, on its withdrawal, he could see right through the hole to the slopes thousands of feet below. RUN he shouted, and we did, to the safety of the steep rocks that we had been avoiding. We had been edging along the snow field to a cornice. That is a section of frozen snow that can overhang a mountainside by many many feet. With the unwary these cornices are apt to break off as an avalanche with disastrous consequences.

Haast Hut spent the Winter under tons of snow and our visit was at the start of the Spring thaw. Usually only its roof was visible and we always had to dig down to the door for entry and expose enough of the hut to help it dry out. Everything would be damp including the blankets, some mattresses even poured water when moved. One woke during the night and felt in a damp hot fever from the moisture. It never did the radio equipment any good either.

Once at Gardner hut I left my boots on the floor overnight. Next morning they were so frozen that I could hardly put them on. A spanner that I had left on the floor froze to my hand when I picked it up. It had been like sleeping in a deep freeze unit. This hut was on a huge vertical sided rock that had to be scaled using fixed steel cables. It was never any fun descending these first thing in the morning when the one inch diameter cable had turned into a three inch diameter icicle and hand gripping was compulsory.

Malte Brun hut was a beauty, large, dry and well stocked with food and reading material. It is located on the side of the upper Tasman Glacier opposite the Minarets with a calendar type view which is out of this world. I always managed to get snow bound at this hut: Nature is quite kind sometimes.

I did not consider these incidents bad times, They were only incidents and quickly put into long term memory. However this type of thing establishes a trust and bond among people, it results in comradeship at its best. It is probably not experienced by a great many people preoccupied with quite petty things by comparison. I feel that I was privileged to have that type of continuing experience over the nine years that I maintained this alpine service.

In a future issue I will recount an anecdote about servicing a faulty radio in one of the high altitude huts.

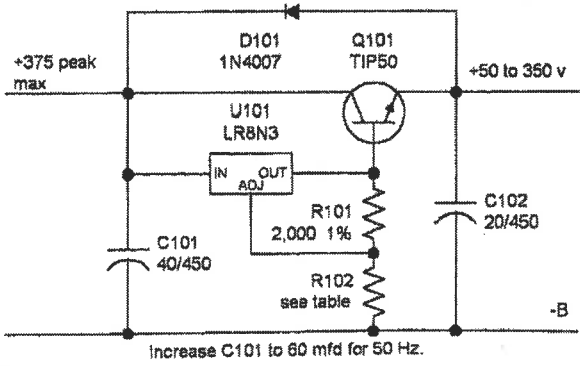
A Solid State Filter Choke or Field Coil Replacement

Leigh Bassett W3NLB

The following article is reprinted with acknowledgment to the author and to the "THE OLD TIMERS BULLETIN - May 2004 ".- Ed.

This simple circuit provides a regulated output up to 350 volts and 100 mA. Ripple content of the output is essentially zero.

Substituting the circuit for a filter choke or field coil in a radio costs less than $2. The output is set by changing a single resistor or a variable resistor can be used.



Notes:
1) Minimum Vin-Vout diffential ~15 volts
2) Peak input voltage MUST NOT exceed 375 volts.
3) Maximum output current ~100 ma.

At the heart of this high-tech marvel is the Supertex LR8N3 three-terminal regulator. Rated for input up to 450 volts and output up to 400 volts, it can supply up to 10 mA of current. The device comes in a TO-92 plastic transistor package. Increased current capacity is provided by using the LR8 output to drive the base of a TIP50 power transistor, housed in a standard T0-220 package. With a minimum beta of 30 for the TIP50, the combination can supply up to 100 mA continuously.

In most applications, the pass transistor will not require a heat sink. For example, in a circuit with 50 volts differential across the TIP50 and 100 mA load, the pass transistor is only dissipating 5 watts. The TIP50 is rated 40 watts dissipation.

The metal tab of the TO220 case is the collector, which is connected to the DC input in this circuit. If a heat sink is required, a suitable insulated mounting kit must be used.

The actual current capacity from the supply depends on the input-output voltage differential across the LR8 and the amount of current which it must supply to the pass transistor. The LR8 can supply up to 10 mA, but it is protected from both over-current and over-temperature conditions by internal circuitry.

The minimum input-output voltage differential across the LR8 is 12 volts. Therefore, the input voltage at the low-point of the ripple should exceed the desired output by at least 15 volts, allowing for the base-emitter drop in the pass transistor. Increase the size of the input capacitor if needed to achieve this.

Note the limit of 375 volts peak input to the regulator. This is measured at the crest of the ripple waveform and ensures that the components will not be damaged in the event of line voltage excursions.

As a replacement for a filter choke or field coil, the active regulator provides 60 Hz ripple suppression in excess of 60 dB with only 1mfd of capacitance on the output. In the circuit presented here, the value should be greater than 66 dB due to the larger output capacitor and the 120 Hz ripple frequency.

Output voltage is determined by the value of R102. The table on the right gives values for various output voltages.

Output Voltage.	.R102-kohms
350	572
325	531
300	490
275	449
250	408
225	367
200	326
175	285
150	244

The supply can also be made adjustable by replacing R102 with a 500kQ potentiometer in series with a 75k 1% resistor.

Parts List

Ref	Part No.	Mfr. And Description
D101	1N4007	Fairchild 1000 PIV/1A Rectifier
Q101	TIP50	ST Micro NPN HV Power Transistor
R101	RN55D	Vishay 2kohm 1/8th W resistor
R102	RN55D	Vishay 1/8th W resistor (value from table above)
U101	LR8N3	Supertex HV 3-terminal Regulator (TO-92)

Note: The availability of parts in NZ has not been explored but the author quotes a vendor "Mouser Electronics - www.mouser.com" as being able to supply at a total parts cost of about US$ 1.99. Data sheets available at onsemi.com (TIP50) and supertex.com -Ed

From *Radio-TV Experimenter*

The Canadian Marconi CSR5 in Action

Peter Lankshear

John Walker's article in the February 05 "Bulletin" about his CSR5 receiver brought back fond memories for me of using them at the NZBC's Quartz Hill receiving station at Makara.

John explains how these receivers had thorough isolation of the antenna to minimise radiation of the local oscillator. This and the low frequency coverage of 79 to 518kHz suggests to me that the CSR5 had been designed for marine service and was ruggedly built and neatly wired, with loomed cables and component boards. They were stable and sensitive and only when reception conditions were at their very worst did the Hammarlund Super Pro and Eddystone 680 receivers have an edge on performance.

When I arrived at Quartz Hill in May 1950, there were several CSR5's in use, mainly for secondary monitoring of non rebroadcast transmissions, but their most important duties were as operators' search receivers, a service that gave their tuning mechanisms a real hammering. The "rainbow" dial and logging scale made for ready finding and resetting of transmissions. Like most communications receivers of the era, to achieve thermal stability, their massive construction required them to be left running continuously, but once they were up to running temperature, drift was minimal. Shortly after I arrived, the latest "top of the line" Eddystone 680 receivers took over the search duties.

One important function was left to a CSR5. The VP3 power supply mentioned by John enabled operation from a 12 volt battery, and to provide a reception backup in the event of power failures, important transmissions such as the BBC Pacific Service 6.00pm News, and "Radio Newsreel" were backed up by a CSR5 with a VP3 switched to vibrator operation and running from a battery. These power supplies were extremely well designed and shielded and vibrator "hash" was never a problem.

Around 1967, the Quartz Hill CSR5's were retired and were offered to radio stations. I very promptly requested one for the new installation in New Plymouth for use in the main Control Room, a showpiece using the latest Toshiba equipment. Although I now shudder at the thought, I had the panel of the receiver sprayed in matching grey Hammerlux enamel. In fairness, it was only a bit darker than the original colour. First though I had the labelling engraved. The engraver insisted that the steel panel was the toughest material he had ever to work with!

John mentions experiencing a common problem of his oscillator not working properly at high frequencies. I have found that a higher mutual conductance oscillator valve solves the problem, a 6AB4 (half a 12AT7/ECC81) being a suitable replacement for a 6C4.

OBITUARY - KENNETH CHARLES STUART

Ken was a Radio Serviceman before he joined the NZVRS on his retirement in 1983. He lived in Mangakino before moving up to Tokoroa last year and kept in touch with our Auckland group of members until about December 2004. His death was reported to us by his solicitor in March this year.

The Delights of Revisiting Tube Audio

The Halcyon Days of Tube Audio Sound Can Still be Ours If We Create New Tube Amplifiers.

Jack Whittaker

Learning from the Past

From past historical Audio Amplifier developments, we benefit from all the years of accumulated knowledge that is now at our disposal. The list of discoveries is enormous: Class A tube operation, AB, push pull, negative feedback, the use of triodes with low impedance characteristics. Nostalgia for the 2A3 push-pull amplifiers with their mellow audio sound and simple circuitry must influence our thinking. It has influenced mine.

Combining the Old and the New

A CD or MP3 player combined with a tube amplifier does indeed produce a great result. Incongruous though this combination may seem, it really is a great idea.

Imagine a stereo amplifier with perhaps twelve 2A3s, at low voltage and low impedance – WOW! If just one triode of a 6336A were to perform the same function as three parallel 2A3 tubes- or even just two, a great result would be expected. We can indeed achieve such a result. I hope this article will encourage individual construction efforts. What better than an audio amplifier project?

Early Trials and Research

Through building several amplifiers with various combinations from pp 6A3 triodes to Ultra Linear circuits, and all manner of phase inverters – "floating paraphase" etc, to cathode followers; I gained general ideas to add to my ham radio background which included the periodic construction of various tube equipment (mostly RF), dating from as far back as the 1940s.

I had the good fortune to purchase three 6336A tubes that- with their husky triodes for low impedance applications, I thought might provide the basis for good audio amplifiers. I had no information on the tubes, but managed to obtain some sketchy data for their use as regulator tubes. The concept of low voltage and low impedance operation seemed an obvious choice. The possibility of utilising **two** 6336A tubes led me to consider unorthodox approaches and with a bit of lateral thinking, a great number of possibilities seemed to exist.

I will not expand on all these ideas now, but I did consider that using the tubes with **low plate voltages** would be an ideal starting point and that this theory should be tested. Bias tests were performed on a hastily built single ended trial amplifier using one triode of a 6336A operating with 140 V plate volts. For each experiment, the tube performance was measured and the amplifier briefly tested operationally using transformers at hand.

Next, I had a transformer made with an 1100 Ω primary impedance and tried this. Trials indicated that 1100 Ω was a bit low for this application. 1350 Ω per triode seemed to be the needed value.

Reference: The simplistic ARRL formula for load impedance resistance calculations:

- For Class A operation, plate volts divided by 1.3 multiplied by plate current.
  Load resistance = Vp / 1.3 x Ip (**V** =Volts, **I** =Amps)
- For Class AB operation, the 1.3 constant is changed to1.5, and for Class B to 1.57.

Other publications also have valuable data, such as Bill Orr's Radio Handbook.

Collecting the Necessary Components

I have habitually devised projects from the parts which are in my collection and 'junk- box', designed things accordingly, and obtained the extra parts that I required whenever and wherever I could. This is now more of a challenge than in earlier years, as not everything that we require is now available so readily, and many components of an older style are not available as new parts. In some instances, I have used more components in the wiring than one might expect - for example for 0.2 µF values needed for inter-stage coupling, I used two 0.1 capacitors in parallel. Similarly, multiple resistors have been used to get the required wattage or value in some cases. I have always built according to what I have and/ or can obtain to add to my parts needed to build a project. The component values which I used were to some extent determined by the parts on hand.

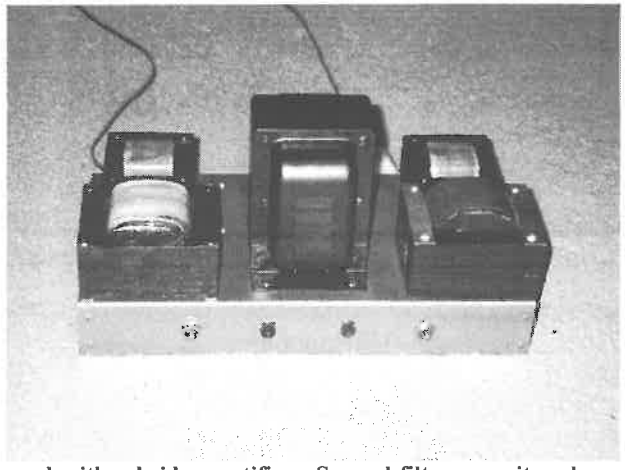
Chassis were made up from cut-down office filing units from an Auto Flea Market. A heavy duty filament supply transformer and output transformers were expertly made for the project in Auckland, New Zealand, by Bill Farmer, who was about to celebrate his 90th birthday. A wonderful job indeed by Bill, who with a lifetime's experience in transformer winding was the ideal person to do this precision job. He later told me that he has since retired from winding transformers. A great guy indeed.

Designing the Amplifier

My objective was to make this amplifier resemble and retain the traditional image of amplifiers of the 1940s or early '50s and to be as simple in appearance as possible. One chassis was used for the power supply and output transformers, and another for the actual amplifier.

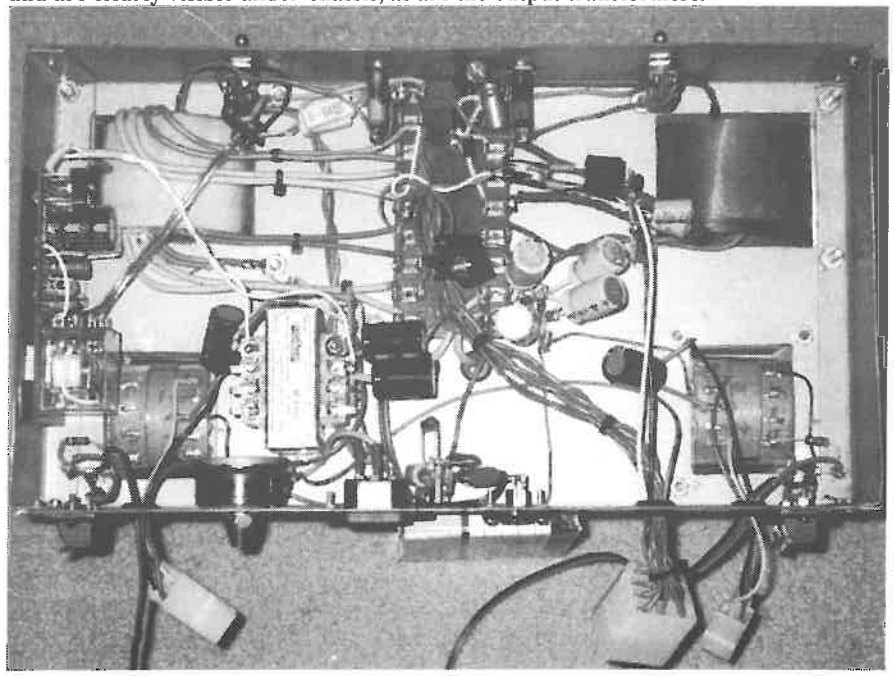
The power supply chassis contains no tubes and all rectifiers and voltage control is solid state - tube rectifiers seemed out of place for this project. I included filament current limiting circuitry to protect the life of the tubes. This includes delay switching with an SCR and relay, to control and limit the initial peak current surge. I did not use cathode resistors for the output tubes; I considered this to be power wasting in this application, so I incorporated a negative bias supply that switches on before the HT voltage is applied. To power the CD player, I have included a 4.5 V regulated dc supply. Additionally, 7 V dc is supplied for the cooling fan operation, and a 12 V dc supply for the delay relay. It all makes a slightly complicated power supply unit.

This is an example of a "design" which "grows" as the project progresses, as can happen with a one off or prototype project, when experiment and augmentation is still in the process. To have all components made for the project would greatly simplify this aspect of design.



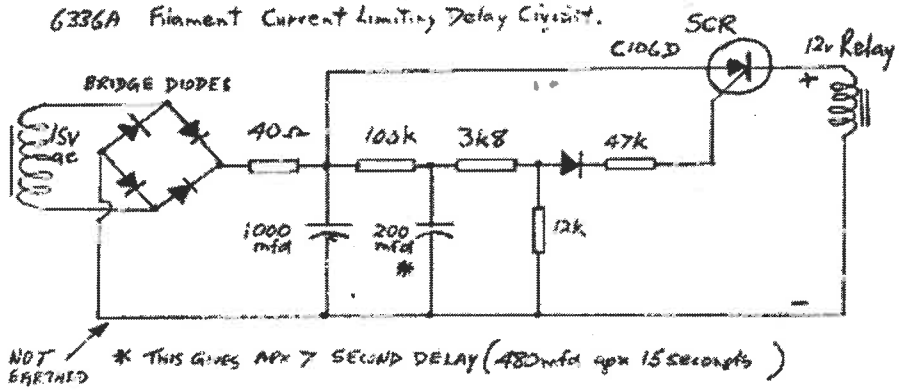
The largest item in the power supply is the very large HT filter choke.

The under-chassis view (below) shows the largest transformer to be the filament transformer at the top left of the picture, with the delay circuit board alongside it. The HT transformer is simply 240 V to 100 V rms (141V peak), used with a bridge rectifier. Several filter capacitors have been used in the power supply and are clearly visible under-chassis, as are the output transformers.

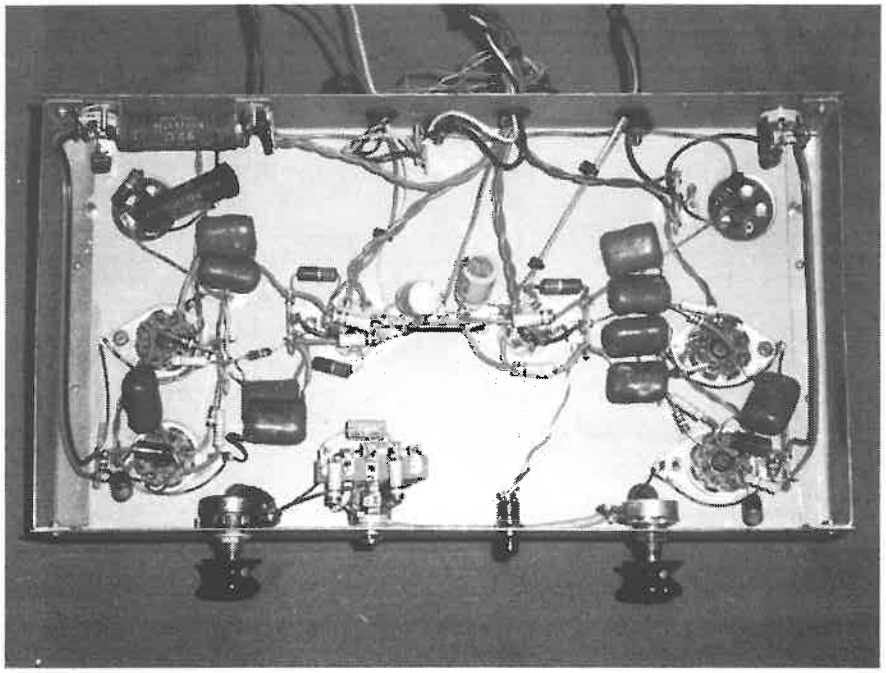


To protect the 6336A tubes from the severity of excessively high filament current at the moment of switch-on a large 100 Ω resistor in series with the primary winding of the

filament transformer is shorted out by the SCR triggered relay which allows full current and voltage to the transformer after a seven second delay.



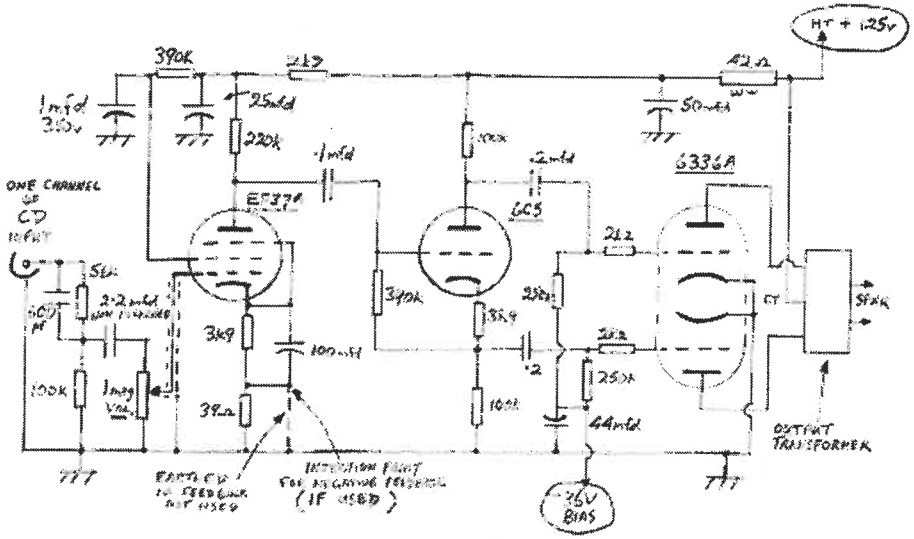
The Amplifier chassis wiring (below) is of much simpler appearance and may appear deceptively simple. Voltage drop in high current filament wiring is a critical factor, so this wiring had to be done with great care. The doubled up 0.1 µF capacitors are clearly visible.



The Tube Arrangement and Transformers

The tube line up is very basic EF37A -- 6C5 -- 6336A for each channel which totals only 6 tubes for the complete stereo amplifier. Possibly, two dual triode tubes such as a 12AX7 with a 12AU7

in a Williamson type circuit, might be a possibility to consider for a 4 tube amplifier (in place of the EF37As and 6C5s), but I did not choose that path.



The EF37A is a tube designed for audio with minimal noise, sharp cut-off and reasonably high gain characteristics and was an obvious choice for the first stage. The 6C5 is an absolutely orthodox phase inverter and superlatively simple in its use. Both these tubes operate with components as designed for 250 V HT but operate perfectly well in exactly the same format when fed by a 125 V HT supply. I did incorporate HT decoupling circuitry. Each 6336A could be likened to a couple of 6AS7s, or perhaps 4 or more 6A3s, so for low impedance push-pull operation, they take a lot of beating. For the results given, we can readily forgive their greedy power consumption.

2700 Ω plate-to-plate output transformers (1350 Ω per triode section) were specially made for the project, matched to 15, 8 or 4 Ω speaker loads.

The filament transformer was made with two heavy windings for 6.3 V @ 6 A each, plus two 6.3 V 2 A windings. All these secondary windings are centre tapped. The primary winding matches the Australian standard 240 V mains supply. I used the separate 6A secondary windings to supply the filaments of each output tube, for minimum voltage drop, and a separate winding for each pair of the preceding tubes to achieve minimal interaction. The filament windings are all centre-tapped. The centre- taps are grounded to ensure a hum free amplifier.

A photo of the finished amplifier is shown on the front cover of this issue

Cooling

Keeping the 6336A envelope temperatures within limits - especially when ambient temperatures (without air conditioning) can exceed 30° C in summer months - necessitated some form of effective cooling method. I selected a couple of small 12 V dc three-wire fans – chosen for their quiet operation, reduced their operating voltage to 7V, and rubber mounted them. This arrangement seems to work satisfactorily and very quietly.

The Amplifier in Action
The available components produced 125 V HT; earlier trials were made using a 140 V HT supply. Bias for the output tubes was adjusted to 36 V giving a standing output tube current total of 195 mA. Negative feedback was tried but has not been used subsequently. The feedback loop can simply be plugged in at any time.

The Important CD to Amplifier Interface
Care was needed with the interface between CD or MP3 player and amplifier both in design and component selection. It was necessary to consider avoidance of phase shift distortion or shadow phase shift in this stage. The design process is not always quite as easy or simplistic as it may first appear. Judicious control of what goes **into the amplifier** obviously affects what is heard from the speaker system.

Speakers
Using a pair of heavy 12 inch Philips 15 Ω dual cone speakers in large home constructed vented enclosures, has proved an excellent foundation for the system, and the sound is really very good. Those Philips speakers rightfully deserve praise. I have made up a crossover network for use with additional mid and high range speakers.

Additional thoughts and comment

Use of the amplifier for several months has been very rewarding and pleasurable. No faults in operation have been encountered. The tubes operate at low voltages and are not stressed. The cooling system has performed admirably.

The ARRL formula for load resistance calculations does closely match up with the components used at the original test HT voltage of 140. There seems little if any discernable operational difference when using 125 V.

Some 6336A tube data recommended a maximum of 500k for the grid resistors in some applications and also a minimum of 200 ohm for cathode resistance.

An old website comment suggested a maximum of 47k grid resistor! The data was mostly fragmented, variable and sketchy and it was for the tubes being used as voltage regulators in most cases. I was mindful of these factors when designing the amplifier and made the design as a total package which included the driver and phase inverter characteristics etc. I have not experienced any problems with the fixed bias or with grid leakage current as designed. The 6C5 tubes also function very well as used in this amplifier.

I have not carried out power output tests. Gross **power** was not the aim of the design and I had no ambition to smash the windows or blow pictures off the wall, but wished to create an unstressed quality home amplifier. There is more than ample audio volume available for most any residential situation. The result of the labours has been very rewarding using these tubes and the result exceeded my expectations. Thanks to Peter Lankshear too, for his subsequent comments on amplifier design and tube characteristics and their operation. Building valve amplifiers is still a very interesting subject and has pleasurable rewards too. I am now working on 6336A amplifier model no 2, and plan to be operating the output tubes very much as per the original design.

Conclusion
Please do not be too daunted by availability of particular parts. Many different tubes can be used to build an amplifier. The output tube range of possibilities is enormous, from 6V6, 6L6, 807 etc, to triodes and transmitting tubes, in a wide range of configurations. As an example, I have found that an 832A will perform a similar task to two 6V6 tubes in a push-pull application, subject to appropriate voltage requirements, giving a similar result. For several years, I used four parallel sections of two 829B tubes successfully in (RF) amplifier circuitry with approximately half an Amp of peak HT current. The range of possibilities for tube amplifiers is enormous.

I have striven for simplicity of basic circuitry in this amplifier, and I hope this article will inspire tube / valve radio enthusiasts and budding constructors to enjoy the rewards of building a really good tube amplifier.

Thanks to my son Paul for his great efforts to help me with this article both editorially and with pictures etc, when he was very busy with a heavy workload. Thank you Paul.

PROGRESS in 1901

Dick Stevenson

I recently found an old copy of "The Daily Mail yearbook", printed in Britain in 1901, the last year of Queen Victoria's reign. Members might be interested in the progress of wireless and the provision of mains electricity at that time.

According to reports a wireless telephony link had been established between the lighthouse at the Skerries and the coastguard station at Cemlyn, in the Isle of Anglesey. Two wires at an average of 2.8 miles apart were used, one being 750 yards long and the other 3.5 miles long. Yet was this true wireless telephony? It sounds more like some kind of induction. Wireless telegraphy using high-voltage sparks and coherers was much more established and Marconi's method had been adopted by the Admiralty. Messages were received over a distance of 86 miles and this was not regarded as the final limit (!).

Marconi's apparatus had been installed in 32 ships and Professor Fleming explained that a receiver would only respond to the transmitter that was sending the message, (tuning had just been invented). Wireless signals had also been sent and received from balloons (still a couple of years to go before the Wright Brothers aeroplane flight).

The main energy source then was still coal and coal-gas, although wealthy house owners might generate their own electricity. If you lived near a factory you could buy some, but it would usually be D.C. and at any voltage between 110 and 230. Britain had not yet built the country-wide "grid" to supply houses with 230v A.C. and the problems of long-distance transmission were being considered. The famous scientist Nikola Tesla, (who favoured A.C) was quoted as suggesting that the electricity could be transmitted over enormous distances by surrounding the conductors with liquid hydrogen. Theoretically resistance is very small at such low temperatures but the expense of installing and maintaining such a system is of course astronomical, although it may appeal to the present-day objectors to 70m high pylons!

Looking to the future, the Yearbook forecast that during the 20th century, electricity would be generated in bulk near coal-fields and bring power and light to mammoth factories and even to the humblest home!

GAS-FILLED VALVES

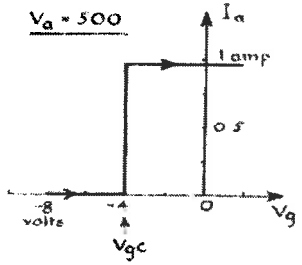
Dick Stevenson

Glass tubes filled with a low pressure gas and then subjected to a high voltage were used in the 19th century as an entertainment (Geissler tubes). The high voltage was obtained from an induction coil and later, more accurate observations and measurements yielded important facts about the structure of the atom. It is interesting to note that induction coils are now looked upon with disfavour in schools as the high voltages could generate X -Rays and sparks could cause radio-frequency interference.

The earliest valves such as Fleming's diode and DeForest's triode would have had a less than perfect vacuum and this was at first regarded as essential to their function. However Irving Langmuir showed that a very good vacuum was necessary for reliable function and long life. Vacuum pumps were improved and R.F. heating and getters drove out and mopped up any residual gases.

Yet valves were still made containing a measured amount of gas and were thought of as superior radio detectors. The famous 200A valve was an example used by enthusiasts during the 1920' s, and up to the advent of transistors, radio-model controllers used the British XFG 1 or the American RK61. Unfortunately, the presence of a gas in these valves meant that as well as electrons there were much heavier positive ions and being attracted to the filament, bombarded it and shortened its life.

The most important characteristic however for these valves was their extreme sensitivity to their anode voltage and hence the current flowing through. Users of the 200A valve as a detector were strictly warned not to exceed 45 volts as the B+ supply. Later it was found that valves with a good vacuum ("hard valves") could make detectors equally as sensitive and gas-filled valves for this purpose were abandoned.

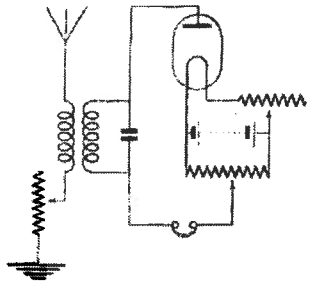


CURVE OF A THYRATRON, Ia Vg. IF THE ANODE IS KEPT AT 500v. THEN IF THE GRID VOLTAGE IS INCREASED FROM -8 TO -4, THE ANODE CURRENT JUMPS FROM A VERY SMALL VALUE TO 1 amp.

It was this sensitivity to anode volts that was put to good use in the thyratron. A special gas-filled triode was used, with a grid that had only a few apertures. While the grid was negative a relatively high anode voltage did not cause ionisation. But if a certain, more positive voltage was applied to the grid, electrons moved towards the anode, and at the same time more positive ions were created in the gas as electrons were stripped off. The positive ions neutralised the negative grid which lost control and a vastly increased flow of electrons, i.e. a large current, now reached the anode.

The thyratron thus acted like a relay and large ones were much used in industry. Similarly in model control a thyratron could vary the current in electromagnets which changed steering or speed. In early television sets the scanning needed a sawtooth wave and this was conveniently supplied by a thyratron such as the 6v type 884 and 4v type T 41. In educational circles the EN31 thyratron, when subjected to a carefully monitored anode voltage showed by small jumps in current how the electrons moved when their ionisation level was reached.

The heroic experiments of member George Newlands, (Bulletin Vol. 26, No. 1) putting a bias approaching 250 volts across a car light bulb (gas-filled these days) showed that at some point there was a sudden ionisation and a big current flowed which violently assaulted his ears. As writer of the letter to the Bulletin (Vol. 25, No. 4) I was quoting a comment from the British "Practical Wireless" magazine when about ten years ago some enthusiasts were re-creating items of the earliest wireless equipment, such as coherers and magnetic detectors. An attempt at making a thermionic diode out of a double filament bulb amazed me by the overvoltage needed to bum out one of the filaments. Unfortunately I did not to check if such a diode really worked, but George Newland's investigations have showed this to be highly unlikely.

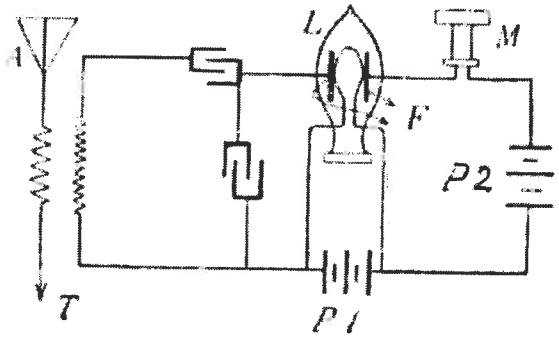


FLEMING DIODE CIRCUIT. THE TUNER IS CONNECTED TO THE ANODE. BUT A SMALL AMOUNT OF BIAS IS OBTAINED FROM THE FILAMENT BATTERY.

In Fleming' s circuit the tuning components were connected directly to the anode of his diode (called by him an "oscillation valve" which of course did not oscillate but as a one-way valve, it certainly detected radio oscillations). Such detectors, because of their reliability were used on ships by the Marconi Co. for a number of years, although their sensitivity was not great. Perhaps during those early times, spark transmitters, sometimes with powers of hundreds of kilowatts and connected to a vast aerial systems were able to slice through the "ether" and a sensitive detector was not necessary.

DeForest came across the Fleming diode but added a higher voltage battery to the anode and claimed an improvement. Later he asserted that he had invented the original diode, but this was demonstrably untrue. However we remember DeForest for his "audion" with a control grid between the filament and anode that was the basis of about half a century of valve electronics.

As George Newlands remarks, he is keeping an open mind about the efficacy of car-bulb diodes, so perhaps someone could carry out some very accurate experiments, varying the voltage on the filament, the anode and bias. Apparently, because of deafness, Fleming did most of his investigations using a voltmeter and a milliammeter. It depends upon which side of the Atlantic your sympathies lie as to who actually invented the thermionic valve, Fleming or DeForest.



DEFOREST'S VERSION OF THE CIRCUIT USED BY FLEMING AND HIS DIODE. A HEADPHONE AND A BATTERY WERE CONNECTED TO THE ANODE WHICH ALSO RECEIVED A SIGNAL FROM THE TUNER THROUGH A CAPACITOR. LETTER 'F' WAS A CYLINDRICAL ANODE. WHILE 'P1' AND 'P2' WERE THE BATTERIES. BUT WHICH WAY WERE THEY CONNECTED?

References:
"Wireless Telegraphy" by Augusto Righi, 1909.
"Harmsworth's Wireless Encyclopedia", 1924.
"Tratado de Radiotelefonia" by E. Nesper, 1925.
"History of the British Radio Valve" by K R. Thrower, 1992.

LETTERS TO THE EDITOR

From a "better half"
I have just read the latest NZVRS Bulletin (vol 26, no1) that was this evening placed strategically alongside my plate of smoked fish and mashed spuds by a certain dearly beloved radio fixer-collector person. As my favourite victuals cooled seriously upon the plate I must say I thoroughly enjoyed perusing the articles therein.

Page 2... I was impressed that meetings are held regularly all over New Zealand. My fellow button collectors have not got to that stage yet. We only have two meetings a year!

Now every girl likes to look at the pictures in a magazine - what else are they for? Gordon Baker's article had great pictures telling the story of his sale and the accompanying weekend activities. Good magazine this.

I did try to read the technical articles too. The writing was good. Creative. And interesting if you skipped the long technical words and numbers you don't understand. I just enjoy getting to know the authors a little by their writing style. What impresses me most is that your NZVRS ,members send in interesting *original* articles. Well done guys.

Then I came to "The Adventures of a Travelling Radioman -part 3" and was amused at his flying adventures and the opening of the Haast Pass. Now I need to find our back copies, probably amongst the "wee room" literature to read the first two instalments (November 2001 and February 2002 - Ed.).
Finally I read the" Musings of a New Boy on the Block" and could not help but agree with the author. David Chapple made an excellent point - how and who will pass along this vast collection of experience and knowledge to the newer and younger members of the group?

Here's my challenge to all you technically experienced NZVRS members...organize some one-day or weekend retreat workshops, or plan some night-school type classes or write some step-by-step articles with accompanying photographs and post them on the 'net' or strike up a buddy partnership with an inexperienced member and work alongside of him... get those thinking caps on and "multiply yourselves' radiowise. My mate has been blessed time and again by teaching others - and in the process learning from them.

The best thing is that although I am only a "member" by virtue of my husband's interest, I have been blessed by the friendships I have made with the "better halfs" of these radio rescuers. Our get-to-gethers over the past few years have been great.

Let me say again...you produce an excellent magazine and not one that's only for the boys! Thank you for your hard work and effort.

Me

Bulletin Cover Page
I am still in love with our old bulletin heading. That long line aerial between the cabbage trees inviting a bit of night-time Dxing. Perhaps pre-1940 is attractive to my ancient mind. But I'm certainly not worried over the change.

Please advise Bill Heinz how much I enjoyed his tale of the past. These glimpses do give great atmosphere. I have a couple of mates who did 'Coast time" many years ago. NZBC's Bill Toft after he exited the RNZAF and Warrick Ferguson was a tech for Greymouth station before he started island hopping. Warrick was our Campbell Island comms Tech in 1964-65 and due to the lack of an ionospheric tech he took that on as well. So it will be a joint effort when we come up with the tale of Campbell's C4 ionosonde in the next couple of months.

Peter Ingram, Christchurch

Bulletin Changes
I liked the changes to the cover page. It seems cleaner and more modern than the aerial in the cabbage trees. Contents listings I felt was more attractive with clearer explanatory details of articles. A big improvement. New members block more prominent and easier to read in bold print. Even Paul's bit seemed clearer.

Thank you for your efforts, the bulletin is always looked forward to and read with interest.

Arthur Horrie, Auckland

Bell General Radios
Your last cover picture featuring General Radios bought back many memories for me. Unfortunately they were not particularly pleasant memories.

I had been a Bell dealer for many years and enjoyed selling the great budget priced radios such as the Colt (£13.19.6 and later as low as £9.19.6) and the Truetone radiograms (£69.19.6). These models were well made and designed and with their isolation power transformers were easy and safe to service. They were relatively trouble free, except for those unreliable NZ made Ducon caps and Morganite pots, that manufacturers were forced to use in those days.

Then along came these General valve models. They used the noisy and unreliable 7 pin min valves, all of them types we had never heard of and certainly didn't have in stock. Many had the dangerous AC/DC transformerless design and were so messy in the way the chassis was mounted in the cabinet that they made the Philips theatrette look simple. With their series string filaments they were very prone to hum and intermittent problems and it was generally conceded by servicemen that they were the worst radio ever produced in NZ. There were a few other contenders for that title but they faded away when these Generals were released.

Even John Stokes in The Golden Age of Radio, describes them as "being of outmoded design, using AC/DC circuitry and Japanese 7 pin miniature valves which proved unreliable in service. .....perhaps the Japs had made it part of a package deal and although Bell pushed the General line hard, it never took off and was soon dropped."

I well remember attending dealer conferences at the time and whenever these Generals were mentioned they were met with a round of snorts and expletives and the temperature of the room rose a few degrees.

Even now, nearly 50 years later, when I phoned a local member to inquire if he had a General I had to hold the phone a little away while he gave me his well remembered opinion of them.

In spite of the Generals and a few other lemons, they were great days to be in the radio business. Very good profit margins enabled us to give complete after sales service. Loyal customers, sometimes whole families, came back year after year for their electrical needs. I well remember one farmer who phoned and asked to have a Kenwood mixer delivered for his wife's birthday and when I asked him what attachments he wanted he said "all of them". Some of our older members will remember how many attachments a Kenwood had in those days.

Compare this with today's gimmicky and misleading advertising, third party after sales service and Chinese made products.

Rod Osborne, Tauranga

Continued Overleaf

Five Valve TRF Receiver

While touring the North Island last November, Nigel Hardy ZL2TX, suggested that I should visit Peter Byam, ZL2JJ as he had some amazing equipment having been a keen "home brewer" for over 50 years. It is true to say I have never seen such examples of craftsmanship in radio construction. The receiver not only looks superb - it works superbly! Having cut my teeth on TRF receivers I know how difficult it is to eliminate hand capacity effects, ploppy reaction, microphony, hum etc.

It was extremely frustrating to have to cut the visit short due to lack of time. Each piece of equipment inspected raised new questions and points of interest. I would therefore urge readers who take up Peter's offer to allow plenty of time for, what was to me, one of lifes experiences!

David Plumridge UK.

As a result of David's visit to Peter and the consequent supply of Peter's article (November 2004), David became a member of our Society. Ed.

Radio Australia Transmitters

The February bulletin is another good interesting read. On page 14 the Toshiba 1kW transmitter interested me. It is amazing the number of hours that a broadcasting transmitter can run up in its life. Here in Radio Australia we have seven 100kW transmitters and two of them, Haris SW100 were installed around 1976 and have clocked up over 220,000 hours each. They run 24 hours a day and around 358 days a year (taking out maintenance days and time to fix faults). They are changed in frequency several times a day which requires tuned circuits, band switches, baluns and the like to be adjusted or to operate often. They haven't worn out yet but they do require a reasonable amount of maintenance..

I have an article to send over to you shortly but have one or two things to sort out before sending it.

Rodney Champness, Australia

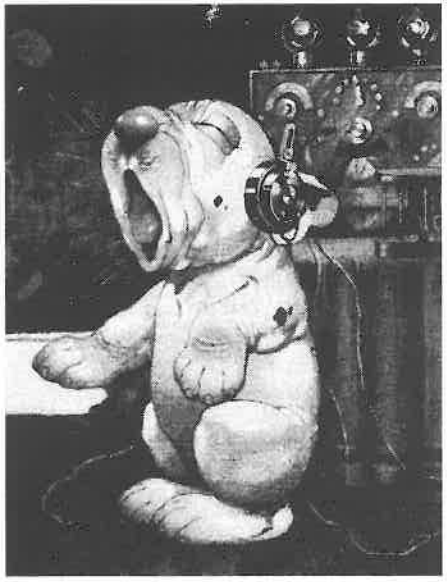
Changing Rectifier Valves

The following hint may interest members. When changing a rectifier socket to use an octal based rectifier such as 5Y3, 5V4, 5Z4, GZ32, GZ34 and some later English 5Y3GT always take the rectified DC from pin number 8. The reason is that some of these valves which use the same socket connections have a cathode around the heater and this cathode is terminated at pin 8.

The American 83V is indirectly heated and has the cathode connected to pin 4 whereas the Brimar type 80, also indirectly heated, has the cathode connected to pin 1.

The advantage of indirectly heated rectifiers is lower internal impedance (volt drop) and slower warm-up time so that very high HT is not applied until all the other valves have warmed up thus minimising over-voltage breakdown. Note that indirectly heated valves are not ideal to use when the 5 volt rectifier filament winding is centre-tapped to sulpply the rectified DC.

Murray Stevenson



Operatic Number

MARKETPLACE

Advertisements for the next issue must reach the editor by the 16th July 2005. Ads must be either hand printed, typed on a separate page or emailed. No verbal or phone ads. Remember to include your name, address and phone number. There is no charge for ads but the NZVRS is not responsible for transactions between members. Address ads to Reg Motion, 2A Hazel Terrace, Tauranga, New Zealand or email regmotion@xtra.co.nz

AVAILABLE

E H Scott 9 valve 4 band, circa 1932, tuner chassis only.
Collier and Beale type 942SWB2 communication receiver.
Offers to Dean Cameron, 422 Hereford St., Christchurch. Ph 03/3892253.

Radios for sale, Ultimate RW, RO, EBU, RBK, EB, RBE, RBK, Courtenay 90, Cromwell 5LSA, Cossor 523A, Hansen, World, Philips A325926, 594, Pacemaker 519P, Sheffield 414, Murphy 1015931, Clipper Flamenco plus 4 radiograms and others. Contact Ivan Mudrovcich, Ph 09/2681474. Ad placed by Ian Sangster.

WANTED

A circuit for a FET substitute for a valve type 01A or equivalent - the emission of my present 01A's is low and unreliable and I need to prove stages of my battery set restorations. The circuit must be proven and indicate component values.
Valves for battery set restoration, RCA 01A's or Philips A609s.
Complete shutter dial mechanism, dished dial glass and set of knobs for a Zenith radio.
Crosley chassis to fit Crosley cabinet that I have - space available 14.5" wide 9" deep.
John Petit, 22W Aratonga Ave., Greenlane , Auckland. Ph 09/5242115.

Small tombstone radios: not working. Like the Stella or Pacific type.
Josef Earle, 5/458 West Coast Rd.,Glen Eden, Auckland. Ph 09/8187978.

5 inch PM Rola speaker as used in Bell Colts, La Gloria Imps, Radio Ltd smaller sets and others.
Murray Stevenson, 2/133 Parrs Cross Rd., Waitakere City 1008. Ph 09/8133565.

Circuit diagram fo a Columbus 26p mantle radio.
Steven Tilley, RMB 8193 Hunts Rd., Willowgrove, Victoria, Australia 3825. Ph 03/56352431, email sjt3825@yahoo.com.au

Circuit diagram or manual for AWA Distortion Analyser type 3A56068. Brian Smith, 24 Coley St, Foxton. Ph 06/3637774

Circuit diagram for Gulbransen 7L, (1936- page 102 of G.A.R.) also Heathkit H.R. 1680 receiver. William Strude, 7 Raurimu Ave, Onerahi, Whangarei. Ph 09/4360482.

Circuit diagram for P&T Dept. type 4110SW Transmitter also bulletin for General Radio Unit IF Amplifier type 1216a Reg Motion, 2A Hazel Tce, Tauranga. Ph 07/5768733. email regmotion@xtra.co.nz

MARINE RADIO HISTORY

Ralph Boshier advises that there is a very interesting Internet Web Site on Marine Radio History including good coverage of all the old Post Office Radio Stations except Makara and Himatangi. This site is compiled by David Smith. The Site Address is

www.morsecode.gen.nz