NZVRS BULLETIN

Vol 33 No 1 **February 2012**

Radio (1936) Ltd 6 Valve Challen Radio Gramophone.

NEW ZEALAND VINTAGE RADIO SOCIETY INC.

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

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Contributions, letters, etc can be sent to:

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ASB Bank account 12 3067 0168223 00

The NZVRS AGM is on Saturday 14 July
A Calendar of Events is listed on our website at www.nzvrs.pl.net/aaa/calendar

AUCKLAND MEETINGS are held at the Horticultural Society Hall, **990 Great North Road** (opposite Motions Road.) Western Springs, on the third Monday of the month from 7.30pm.
March: Monday 19 NZ Made Sets
April: Monday 16 Auction Night
May: Monday 21 Exceptional Radios
June: Monday 18 Auction Night
July: Saturday 14 AGM from 10am

TARANAKI AREA MEETINGS are held on the second Sunday in even months. Visitors most welcome; contact either Bill Campbell, Phone 06-753 2475 or Graeme Lea, Phone 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 on the first Tuesday of odd months 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

The subscription year is a calendar year (1 January – 31 Dec). Subscription renewal slips are sent with the November Bulletin with final reminders in the February issue. NZ Rate is $25 for new; $20 early bird renewal before 15 March, $25 after. An E-version is available at the world-wide rate of $20 p.a. or $5 per issue via download. Note these are usually about 20 Meg files.

EDITORIAL

Well bulletin time again and while the contents list looks small I am impressed with the quality of material that some members produce. There are a number of queries in the feedback and correspondence that members may be able to assist with. The NZP&T Type 242 set usage for one, Carter Radio another. Then Rodney Champness alerts us all to the passing of analogue TV and likely speedy dumping of that technology if we are not quick. There is a Radar request for info from Bruce McMillan and Peter McQuarrie has a couple of safe and cleave ideas when it comes to modernised radio resurrection. There is an item on Vern Butcher an international Meccano radio award winner of the late 1930's and requests for info on 2YA and 3ZC pictures. However if that was not enough the bulletin is even luckier to have a complete item on the restoration of a Murphy 5V Theatrette done by Tim Saunders – a masterpiece and almost worth considering for the "Basketcase Restoration Competition" for the AGM. It certainly sets a high benchmark and standard to aspire to and although longish in the bulletin, when set to A4 paper size it is perfect in length. While mentioning this topic I think I can reasonably say there has already been an entry received for the competition and that as the AGM is set for the 14 July this year, entries will close 10am that day. Certainly earlier entries would greatly assist the secure copying process for the judging.

I trust there is something in this issue that provides some interesting reading and perhaps you might even be able to assist one or two of the queries. Reply correspondence direct to the contributor is fine but via or copy to the editor is always more rewarding from our perspective – call it update or feedback!

Cheers, David Crozier

NZVRS Bulletin
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CONTENTS

The Cover Picture:

The Challen RG was a 1949 production model that featured gramophone and dual wave shortwave radio. The horizontally mounted 8 inch speaker and radio controls are under the lid and are hidden when closed. This model cost £63/10 (approx $4340 today!) and stood 3 feet high.

New Members

D Searle D	**NSW, Australia**
P Oxwell	**WA, Australia**
A Benwett	**Gore**
D Lawrence	**NSW, Australia**
I Mawston	**Auckland**
S Cohen	**Taupo**

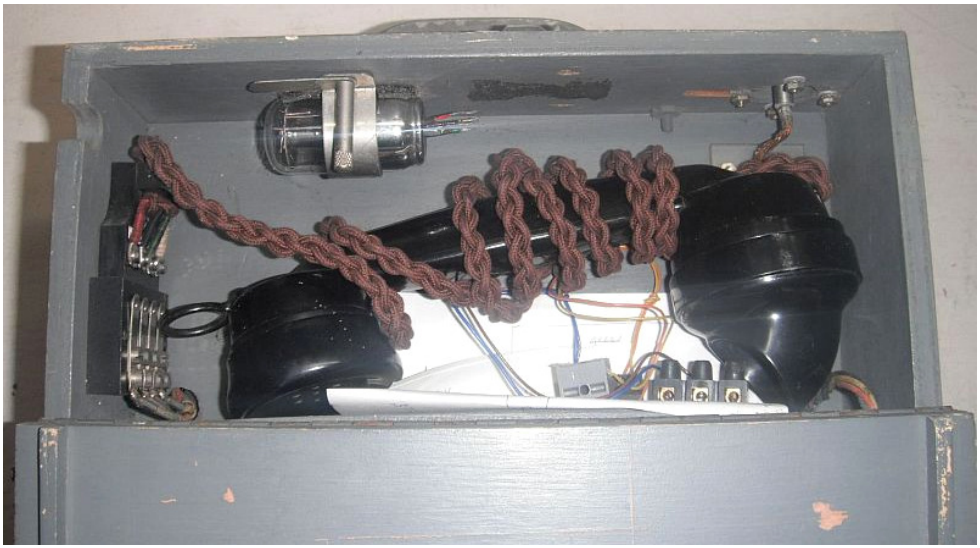
Noted Passings

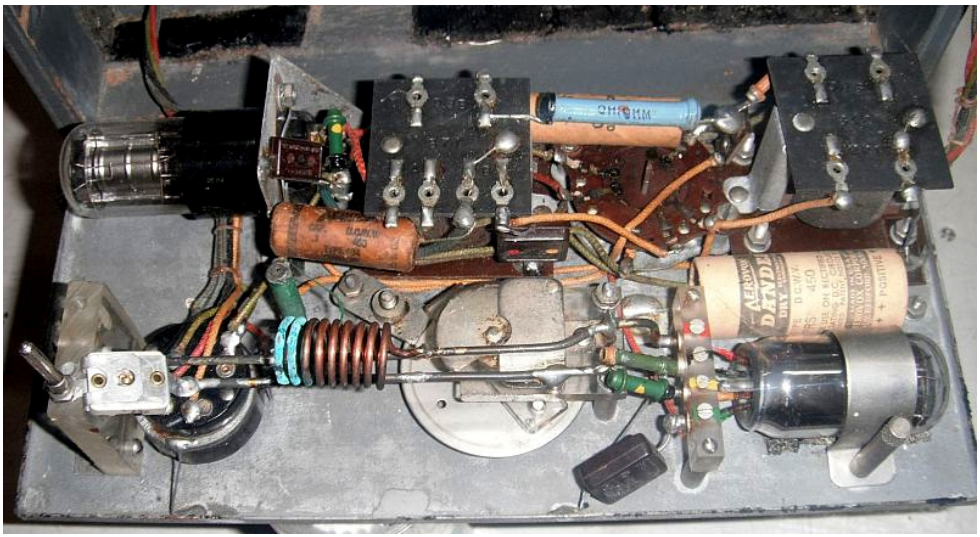
W McCafferty **Auckland**

Correspondence, Letters, Requests etc …

Type 242 Transceiver information wanted.

Hi, I am trying to find some information on the radio in this picture. it is a Type 242 transceiver made by Radio (1936) Ltd in Auckland. It is probably working in the low VHF frequency range. It appears to be similar in design to a British Army WS17 set. The telephone handset and spare valve is in the back of the box, and has a battery box at the bottom. The front panel has some reference to NZP&T Department so maybe they were the customer. I hope to get it going in the next few months, and find out what frequency it tries to be, but I don't expect to work much DX on it. Some interesting features I noted - the radio is held in with butterfly screws on the outside, did it have to come apart that often? The front flap has a wooden ring so it cannot be closed with the set left on. The RF valve has had its base removed - I presume to lower the pin capacitance. Could valves be bought like this? The front panel shows it to be UHF but I think they called anything over 30 MHz "UHF" in those days. The aerial rods are held in a clip on the top surface. Can any of your members give me any information on this? I would love to know when it was made, I am guessing just post war, and why it was made.
Many thanks, Kelvin ZL3KB via Email: KB.EW@xtra.co.nz





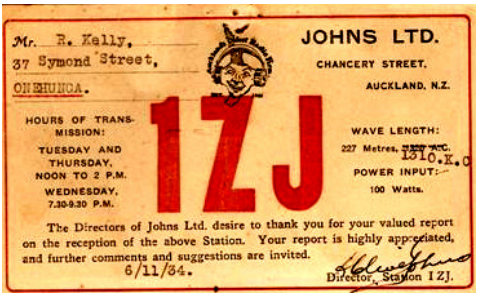
Hi David,
I have answered Kelvin directly, I have never seen this 1942 set which was obviously ordered by radio purchasing on behalf of some Government Department such as Forestry or Civil Aviation. I would have been working on Radar at that time or away in Fiji. The circuit is quite straight forward being a Hartley oscillator possibly super regenerating on about 50 Mc/s L2 being the tank circuit with CV2 and stray capacitances. It could have been used by NZPO technicians for communication while checking Defence Department directional antennas which were located on NZPO HF radio stations at that time. I do not know any technician who is still alive.
Regards, Reg Motion

Seeking Carter Radio information.

Hi, My name is Rick Lammas,VK4NRL. ricketanne@bigpond.com
I am looking for any info on a radio branded "Carter". Built in the 1950s I would think. It was built in Picton by Laurie Carter who held the callsign ZL2AIA, later ZL1KE.
After a long search, I now have one of these radios. It is in a very poor state but I will rebuild it - so I'm looking for photos of the dial glass plus any other info or parts. Rgds, Rick
Bruce Churcher replies:
I think our wider membership could help Rick with info if his email is published. Ross knows of a Laurie Carter living / lived on the north shore which ties up with my Callbook location of Torbay in 1981. The 1951 Callbook has Carter in Picton, so this agrees.

QSL Card Requests

Since 1950 I have had a keen interest in the hobby of BC and SW DXing. In recent years I have written a history of the hobby from the 1920s to the formation of the NZ DX Club in the early 30s to its demise in 1948. I am now endeavouring to accumulate a full set of NZ broadcast stations QSL cards and letters from that period. I have compiled a list of NZ broadcast stations operating from the late 1920s to 1950.
There are approximately 27 stations that are missing from my collection from that period. I would like to get in touch with any one who has NZ QSLs from this period and who would be interested in swapping or selling cards / letters from this era. If any Australian member is interested I have many Australian QSLs available.
Contact: Barry Williams, Pinesong M3, 66 Avonliegh Rd., Green Bay, Auckland 0604. Tel: 09 817 4437, Email: **barrydx@xtra.co.nz**



Letter to the Editor on TV collecting.

Greetings to our New Zealand friends, seems Christchurch is copping a battering again with earthquakes. I trust that this series is the last for many, many years. I wish you all a happy Christmas and a great New Year. Below is a letter to the editor for the magazine should you choose to publish it. Yours sincerely, Rodney Champness. Email: rodlynn6@bigpond.com

Preservation of analogue TVs on the migration to digital signals.

Whilst restoration and operation of the old black and white analog television receivers is not a major part of interest of members it will I believe become more so as analog TV disappears. Already many regional areas of Australia are now exclusively digital with no option to watch analog. In the purely digital areas many local councils, encouraged by the government, have allowed people to discard their analog TVs for free at recycling depots. Many of these sets were in perfect working condition. Some analog TVs have been kept in operation using set top

boxes, as I have.
There are a couple of points I want to make before all our vintage televisions end up in landfill. If you are at all interested in vintage TV or what will become vintage, even if only vaguely interested, I suggest that you keep at least one example of an early valve black and white set, a solid state one, and a colour set. The next point is how will you provide a signal for a valve black and white set with no AV inputs? This can be provided by a VHF (but not UHF) RF modulator which can still be obtained from some Radio TV resellers. Another method is to use a redundant VCR (yes, they are vintage too) with an output on VHF. Many of the later ones only have a UHF output which does not suit early valve TVs. Some set top boxes do have an RF output but this is invariably on UHF.
So I do encourage members to think about this and do something about retaining our TV vintage equipment before it is much too late. Rodney Champness.

The progressive phase-out of analogue TV transmissions is a world wide happening. (see: http://en.wikipedia.org/wiki/Digital_television_transition) this has started and continues here in New Zealand over the coming year. {Also see analogue switchoff, (http://www.goingdigital.co.nz) which will begin on 30 September 2012 and be completed on 1 December 2013}. Members should be well aware that normal analogue TV transmissions will completely cease in NZ after 1 December 2013 – the last converted area being the upper North Island, other regions will have lost analogue transmissions earlier. The set top box mentioned in Rodney's letter (eg Freeview) is a common adapter to convert digital transmissions into an analogue signal for older TVs - however there are a number of drawbacks, especially for multiple analogue TV setups within the home. Ed

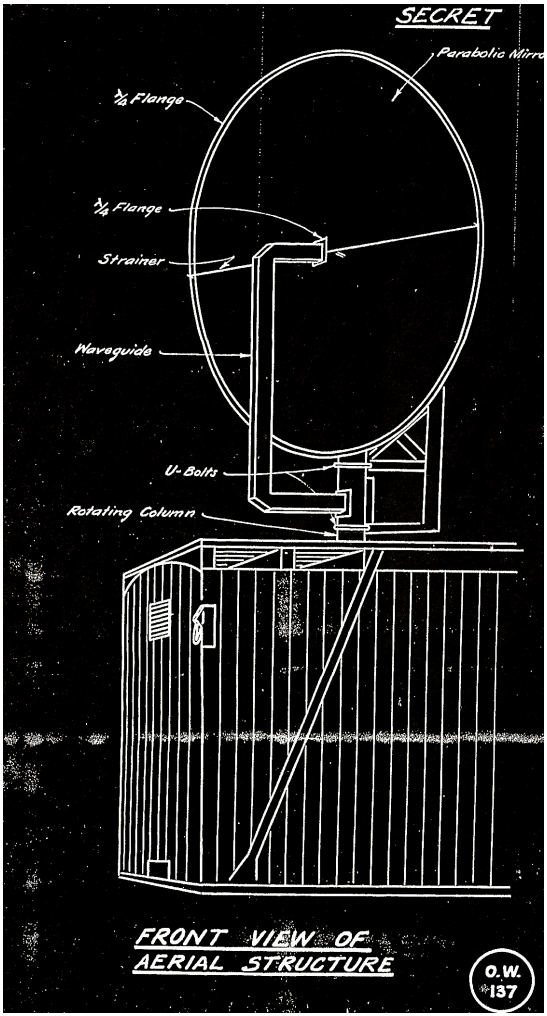
Digital migration map – ie when analogue TV transmissions stop:

World War 2 RADAR set, Cabin and Equipment.

From Bruce McMillan *Former owner of the Dunedin Radio/Hobbies/Computer shop called Eclipse Radio, which opened in 1942 and closed in 1993 Ed.*

On June the 20th 1944 a British RADAR set type CD (Coastal Defence) No: 1, Mk V was declared operational by the NZ Army, it replaced the second RADAR set that had been installed at Rerewahine (near Taiaroa Head) on the Otago Peninsula. The CD No: 1, MkV was a centermetric set built in the UK, it had a range of 43,000 yards (+/- 25) and a bearing error of +/- 5 minutes of arc. It was used for Coast Watching, Gun Fire Control and Early Warning.

The Cabin that once contained the RADAR set was later purchased by Tom Rowlands ZL3JX, a Canterbury farmer. Tom used it for years as his Radio shack. Following Tom's death, I, (with the help of Stan, a Dunedin based HAM) tracked the Cabin down. In time it was returned to Dunedin where it was placed in storage for several years. The search for the cabin was carried out on behalf of the Otago Peninsula Trust's Fort Taiaroa Sub committee. Recently the cabin was moved to the Otago Peninsula Museum at Portobello where it is to be put on permanent display. It is planned to replicate the equipment that once occupied the cabin and to that end I am asking for assistance from any one who may be able to provide information and/or parts that will help us to recreate what the interior of the cabin was like back in 1944. Obviously it is not intended to fully replicate the equipment, only to build suitable cabinets complete with control knobs, displays, etc. Fortunately we have the cabins 2 metre dish.

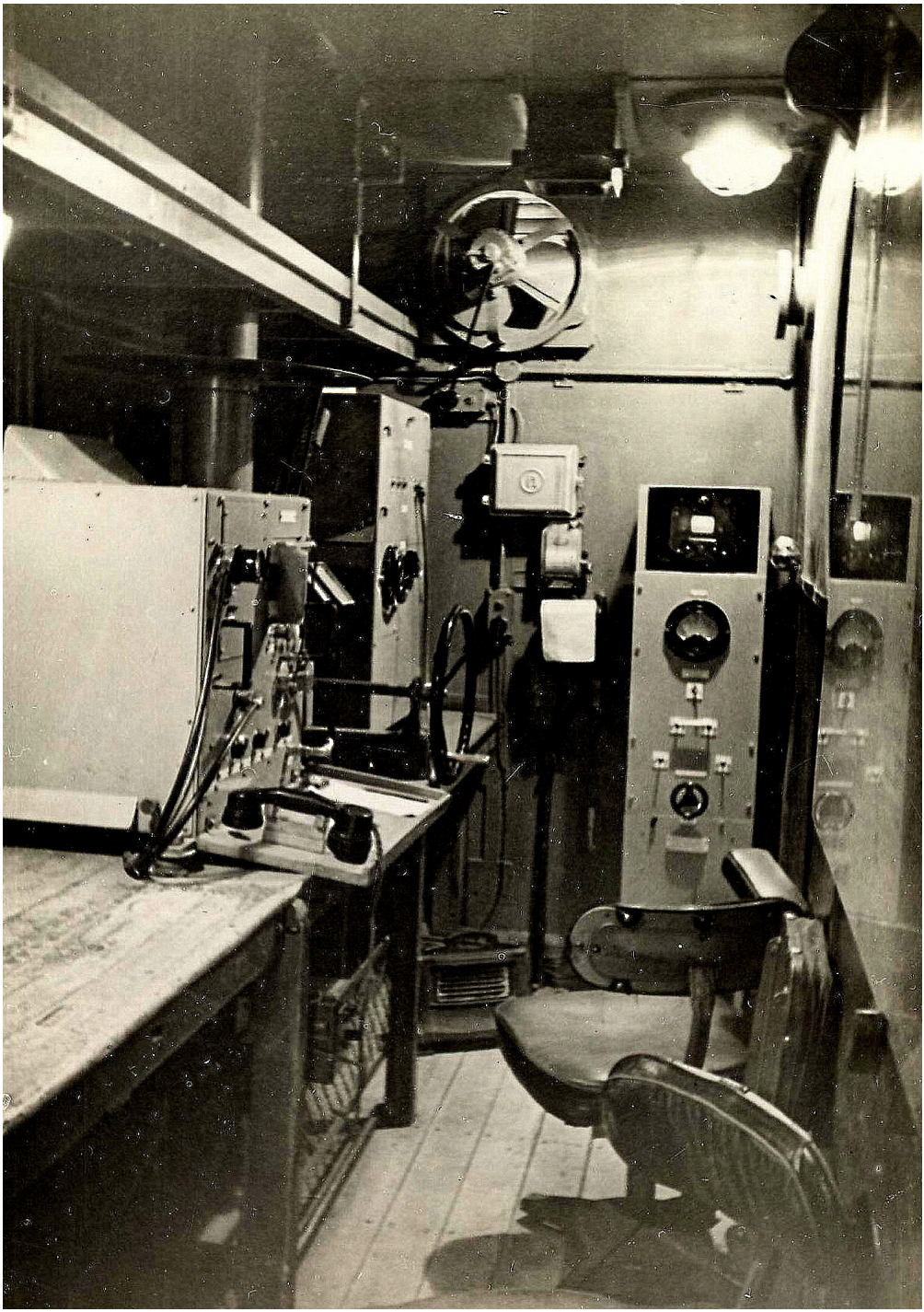


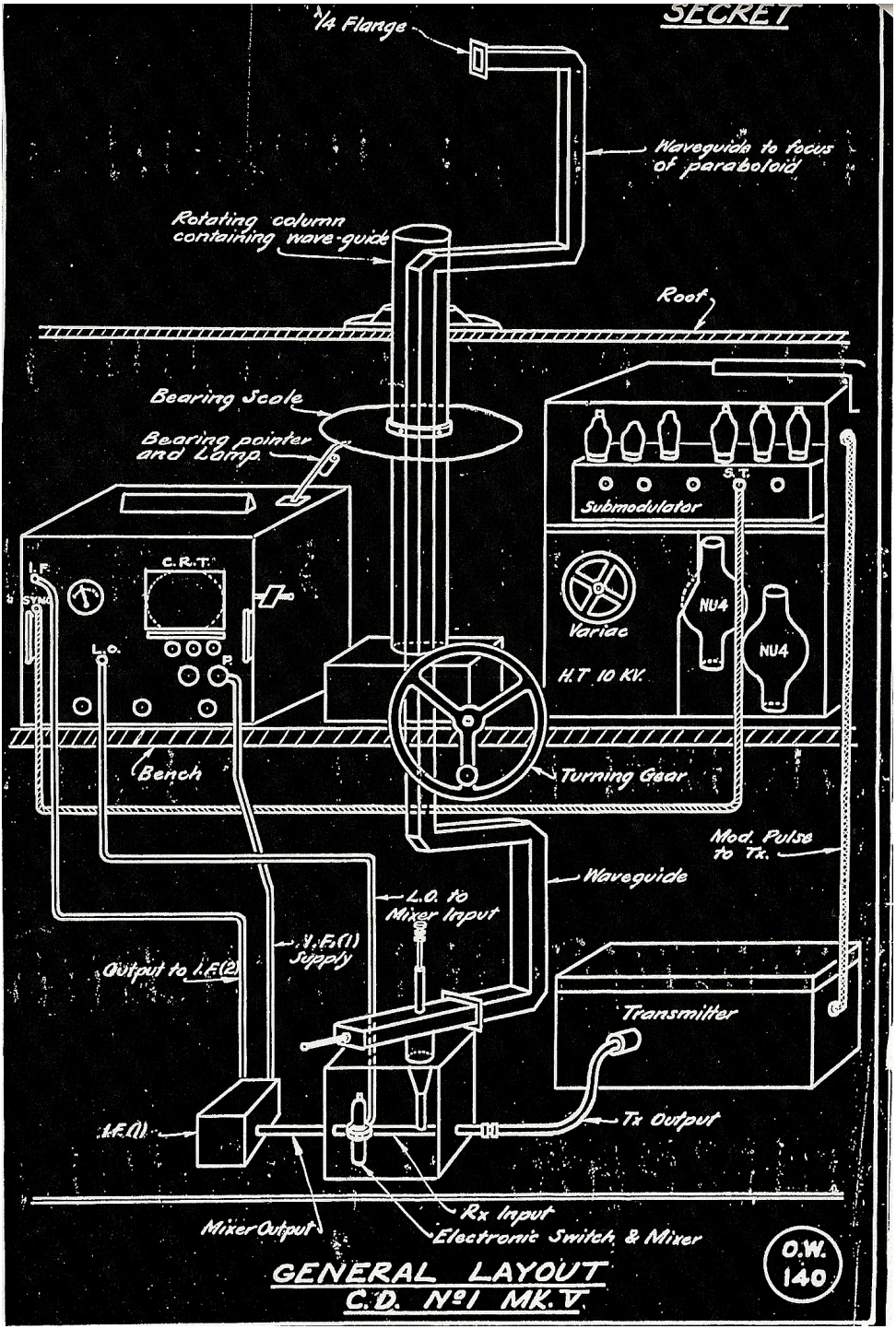
The Otago Peninsula Trust is fortunate to be in possession of some circuit information and pictures of CD No: 1, Mk V, sets from the late W.G.(Gib) Pinfold's Collection. Gib was in the NZ Army and worked on maintaining various RADAR sets during WWII.

The pictures included with this article show something of the RADAR Cabins exterior and interior of the cabin.

We are looking for any item which would assist us in replicating the likes of the front panel eg a VCR97 and/or a 5BP1 CRTs, period knobs, meters, wheels, chairs, fan, heater electrical fittings etc would be a great place to start. Anything that members may recognise or could assist with would be greatly appreciated. Contacts are:

Bruce McMillan, ZLK4BAM, 03 445 4124, email: brucemcm@slingshot.co.nz or Laurie Stewart 03 4777268, email ltstewart@ihug.co.nz




SECRET
¼ Flange
Waveguide to focus of paraboloid
Rotating column containing wave-guide
Roof
Bearing Scale
Bearing pointer and Lamp
S.T.
Submodulator
C.R.T.
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Sync
L.O.
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Variac
NU4
NU4
H.T. 10 KV.
Bench
Turning Gear
Mod. Pulse to Tx.
Waveguide
L.O. to Mixer Input
Y.F.(1) Supply
Output to I.F.(2)
Transmitter
I.F.(1)
Tx Output
Rx Input
Mixer Output
Electronic Switch & Mixer
GENERAL LAYOUT
C.D. No1 MK.V
O.W. 140

A Restoration Tale – The Philips V7A "Theatrette"

by Tim Saunders

This set had always intrigued me with it's chassisless construction, with valves and components draped around the 4 sides of the case and the speaker in the middle. Also, tales of 'never again' and dire warnings from some other restorers indicated a challenge, so when an affordable set came up for bidding, I had to have a go, and became the new owner.

The story starts with the sets arrival. Unpacking breakable sets is always nailbiting, but this one had somehow survived. I knew there was no back, power cord, or rectifier valve, but I didn't know about 4 holes drilled in the top and side at each end of the rear of the case - to hang

it up perhaps? The seller claimed the set worked, but one look at the perished wiring and corroded electrolytic cans meant I wasn't going to risk trying it.

The first stage was to gather as much circuit and other info as I could from NZVRS and internet sources have a thorough inspection of the set and decide what level of restoration would be appropriate. Apart from the holes, the cabinet looked ok, the speaker cloth was torn but this turned out to be added fabric covering the original, which was dirty and faded but sound. The dial showed 3 bands; LW, MW (with NZ and Australian stations indicated) and SW 5.5 - 17.5 mc/s, so this was obviously an export model.

Most of the wiring needed replacing, along with the cracked black moulded capacitors, and the dial cord was broken. Everything was dusty and grimy.

A view of some of the gunge.

Resistance checks on power and output transformers and speaker seemed normal. A sketch of the valve types and positions was made before removal. The valves were different to those indicated in the circuits I had received (as shown in brackets) AK2 (FC4) Osc/ converter, AF6 (VP4B) Var. Mu pentode If, ABC1 (TDD4) det./triode amp, PEN A4 (same) pentode o/p, missing (1821) full wave rectifier.

I had a '506' rectifier, which although rated a bit lower than 1821 would still meet current demands of the set.

All filaments were 4 volt.

Closer examination of the internal layout suggested the possible sequence of assembly as follows: Speaker and metal grid holding the grille cloth would have been in place first. The 3 gang tuning capacitor, dial drive mechanism, output transformer added. Then the rest of the circuit including valve sockets, perhaps pre-wired on a jig, could then be dropped into the case and a few connections made.

The second stage started with the removal of the assembly holding wave change switch, antenna, bandpass, and oscillator coils, and the AK2 socket.
The first snag: The grub screw holding the switch knob was seized solid. Being a Philips, the screw went right through a threaded hole in the shaft. Heating the shaft inside the set, adding kerosene etc failed to loosen it, also half the screw had broken off on one side of the slot. (All the other knobs came off easily – *a well documented Murphy Law. Ed.*) Butchery was called for. The knob was finally hacksawed free and a slot cut in the end of the shaft, parallel to the screw and just reaching it. A screwdriver prised it open enough to free the screw.

The knob was epoxied back together and any gaps filled with a mix of superglue and Bakelite dust. Note: this works quite well to repair Bakelite, but the mix sets hard almost immediately, so dripping in the glue then sprinkling the powder is usually necessary. *[or try using superglue gel. Ed.]* A new screw was made from a longer one of the same thread.
Photos were now taken off the wiring to be disconnected, and wires were tagged with bits of masking tape to indicate where they went. Once free of wiring, only the pitch holding the two aluminium coil cans to the case needed to be unstuck. Fortunately it was very brittle and easily came off.

With the assembly out it was given a good cleaning by brush and solvent before checking mica caps and replacing black moulded ones with yellow axials sprayed black. Tubular caps were re-stuffed with 630 v axials to maintain a vintage appearance and the distinctive red resistors, if high in value, were bypassed with small modern types for the same reason. All coils were checked, and switch contacts sprayed with cleaner. Some wiring was marked for replacement, other in reasonable condition was left in - if it was not HT or in danger of shorting.
Before re-installing the works, the inside areas of Bakelite were cleaned and the 3 gang tuning cap checked. Its rubber mounts were hard but it sat in the right place, so were left alone.

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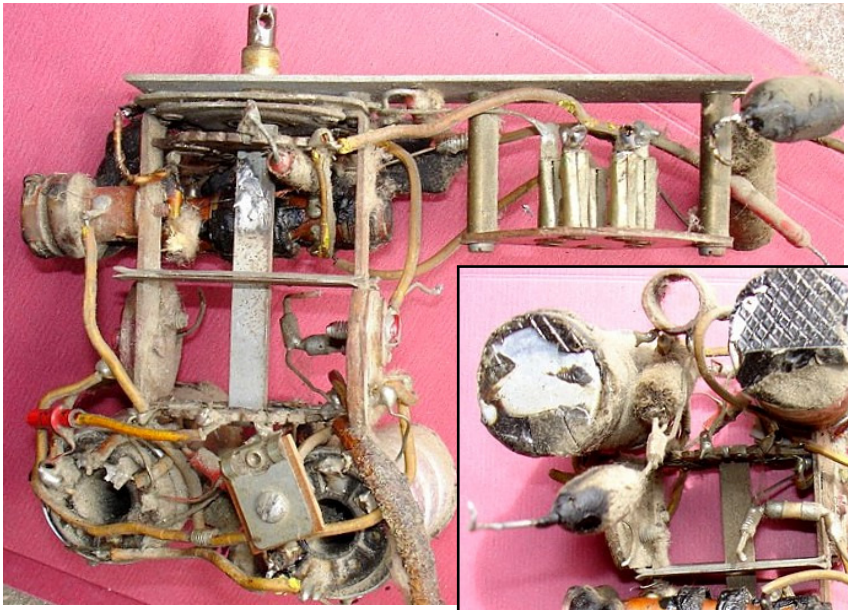
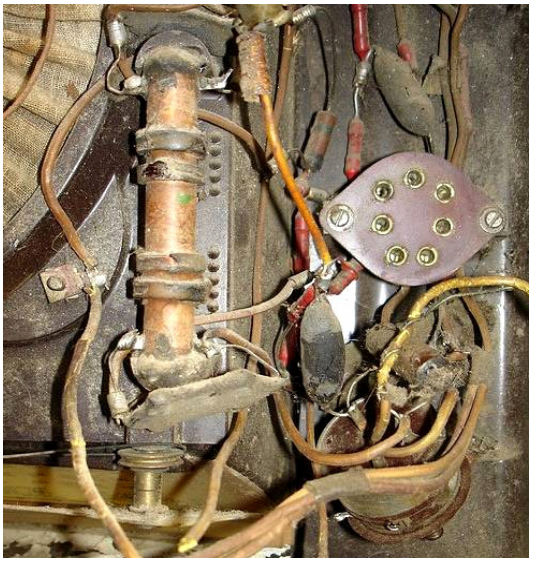




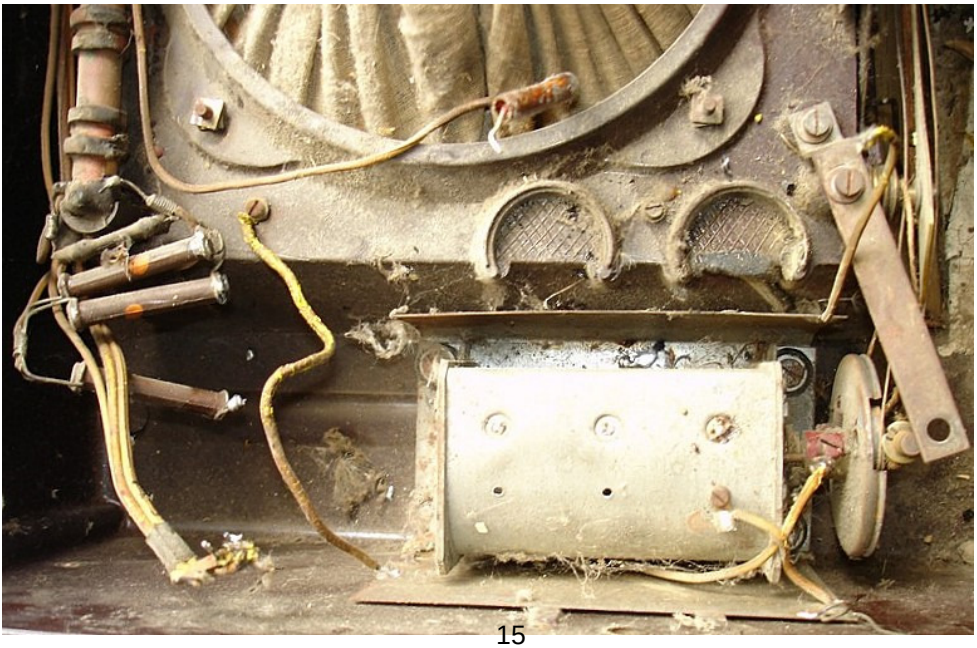
Left: Replacement volume control and restuffed capacitor shells.

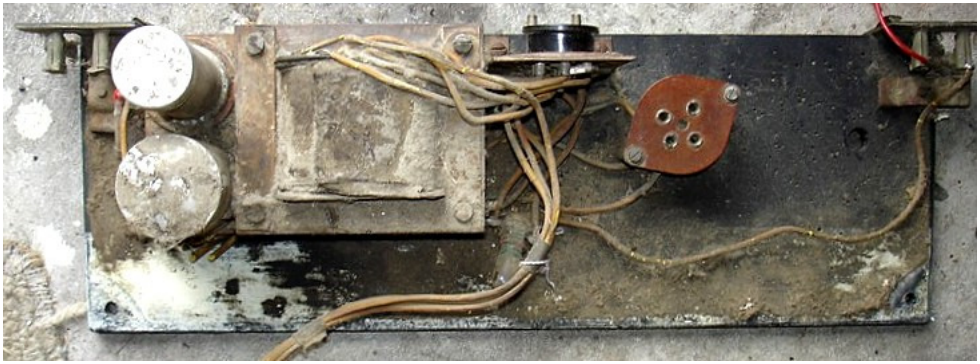
Above: IF stage original

Very Top: Wave change assembly

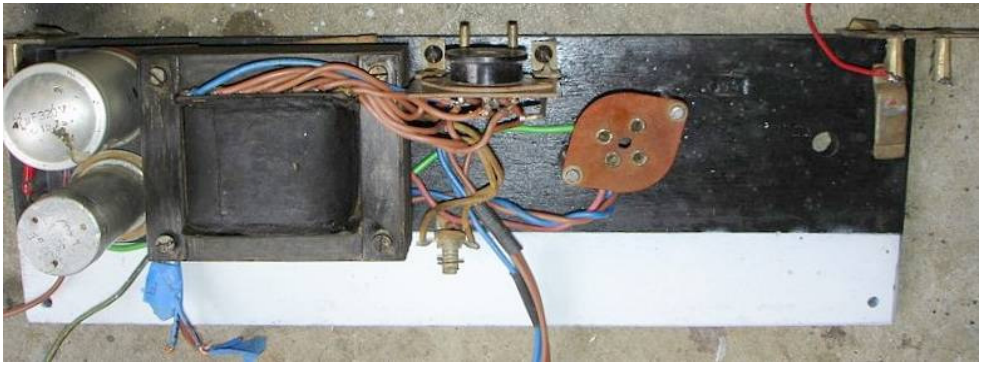
The circuit showed there was no RF stage but a sort of tuned bandpass applied to LW and MW only.
The assembly was re-installed and the old wires reconnected temporarily.

The third stage involved the removal of the ply base board holding the mains transformer, voltage selector, rectifier, smoothing caps and 4 volt dial light. 4 screws held the base in. HT 'earth' and filament wires were disconnected with some difficulty - with the base half out. The same procedure of tagging, photographing etc was followed.





Borer had had a go at one part of the power board, so after cleaning, these holes were filled and the board re painted black with a strip of white where the bulb was mounted.



All wiring was replaced on this board
The electrolytic cans were removed, hacksawed at the base and the contents replaced with new axial 450 volt caps. The cans were then epoxied back together again.

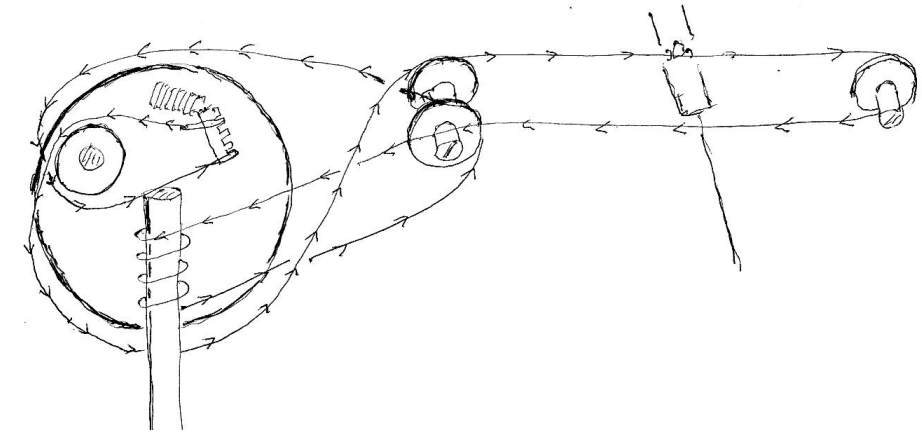
Schematic showed a 2K0 dropping resistor between these caps, but an obvious replacement had a value of 20K0. It was converted back to spec. A tag strip was added to the board to make connections, and future removal, easier.
Lacking the original power cord, which connected via two prongs, a new cord was wired in and clamped in place. The prongs were insulated by a block of wood which will also be clamped in place.

The Fourth Stage. Dial cord re-stringing. This is only really possible with the base board out.

To further ease the job, the piece of light diffusing celluloid and the dial scale were taken out, cleaned with water and detergent, and then a coating of car wax applied and it was put carefully aside.

A UK website provided a sketch of the stringing direction and the remnants of cord (with added 'real' string) gave some more clues, however when new braided nylon was threaded up it was obvious that some changes were needed. The cord rubbed against the Bakelite and it wasn't parallel to the dial pointer mount at all points of travel. Variations were tried, until one

was found that worked smoothly. Light oil was applied to all moving parts. Crimping of the dial cord to its mount was left until after alignment was completed.



The Fifth stage started with removing screws holding the valve sockets, so that the rest of the wiring and components could be lifted clear of the case for cleaning, replacement and rewiring. Also, the metal grille holding the speaker cloth was removed and left out until the case was polished. The speaker too was removed and dusted, including the cloth surround, then replaced.

The remaining original wiring was now replaced, one wire at a time. When done, the main bundle of wires was wrapped together with pieces of bicycle inner tube and contact glue. Everything was then screwed down again and the base board wired in, but not fastened down - just in case!

Stage Number Six was the breath holding one of applying power - initially via a 60 watt bulb. When this settled down to a feeble glow, it was deemed safe for full mains power. The result was a quiet set, dead quiet in fact.
The DC voltage at the smoothing caps was ok, and HT at the valves, referenced to the negative line in the power supply seemed normal too.
Further measurements and head scratching finally gave the answer. The set did have a chassis after all! The metal grid holding the speaker cloth formed part of the negative supply circuit. Wiring was put in to bypass this and finally the set came alive. Voltage readings were all close to spec, allowing for the modern meter used.
But it wasn't going to be that easy. The volume pot didn't work until about one third rotation, and touching any component or wire around the Ant./RF assembly gave a crackle and loss of signal. The pot was removed, and dismantled. Most of the first part of the track had worn off but by cutting and resoldering the moving arm, an unworn part of the track was swept.

Alas, the rivet connecting the track to its terminal was loose and had damaged the track. Fortunately, I had a vintage pot that would do the job and it was swapped in.
The poor connection was harder to track down. In this section some of the original wiring remained and the stiff single core tended to move everything at once. Only by replacing some with flexible wire was the fault located at the terminal of the mid section of the tuning gang.
The Ant/RF assembly was removed again to gain access. A dry joint was revealed; in fact it looked like the wire had never been tinned in the first place. Single core wire seems to be a bit prone to this.

The Next Stage; Alignment. This was quite simple if a bit unusual. IF frequency is 128 kHz, and the coupling between each of the two pairs of coils on each former is adjusted by moving the outer ones only. There is no shielding over the coils. But first the wax has to be melted. A hot air gun did the job, and the IFs were peaked.

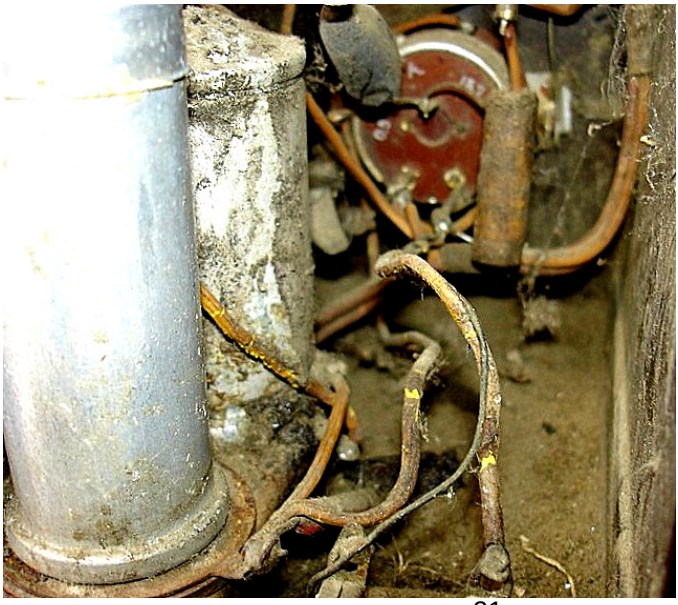
Next, the signal generator was set to 1450 kHz, a couple of trimmers adjusted, and the dial pointer was set.
I didn't bother with LW, (it had one of those nasty wire around wire trimmers) and there was no procedure for SW, but the signal generator. Showed the frequency markings were reasonably accurate. The set was now performing quite well on MW, if a bit weak on SW and it was time to turn to the case and grille cloth.

The Final Stage was to first fill the four holes with the superglue and Bakelite dust mix. A piece of tape was put across each hole inside the case and a drop of glue added from the top then some dust pushed on top. In this way the level was slowly built up until slightly proud of the surface. When hard, it was scraped then sanded down until level with 600 then 1200 Wet & Dry paper.
The whole case was then gone over with 1200 W & D, followed by 'Autosol' metal polish and finally brown shoe wax.
Note: Once the original shiny Bakelite surface has gone, the fillers (if used) are more obvious and the surface seems 'hungry' for wax. Applying this over several days before final polishing usually works well.

Cabinet holes before and after.

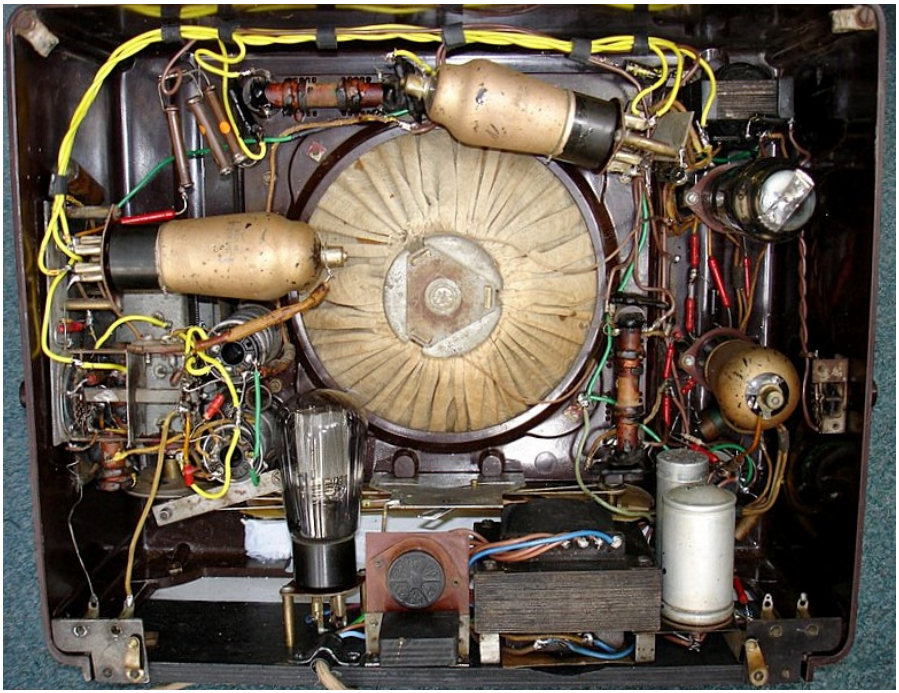
Lastly, the old torn piece of fabric covering the original grill cloth was removed. Metal strips and spikes held the cloth, so there was no glue to worry about.
The factory cloth was in good condition but dusty and faded. It was vacuumed then wiped with a damp cloth. I have learned the hard way not to wash such fabric; there is just too much shrinkage.
When dry, a couple of light spray coats of gold were applied and then the surface was wiped with a turps rag to reveal the raised bits.
Using suitably coloured paint this way can really refresh old cloth provided it is not overdone.
The grid and cloth was re-installed and the metal connected to the negative line, although I did leave the bypass wiring in place.

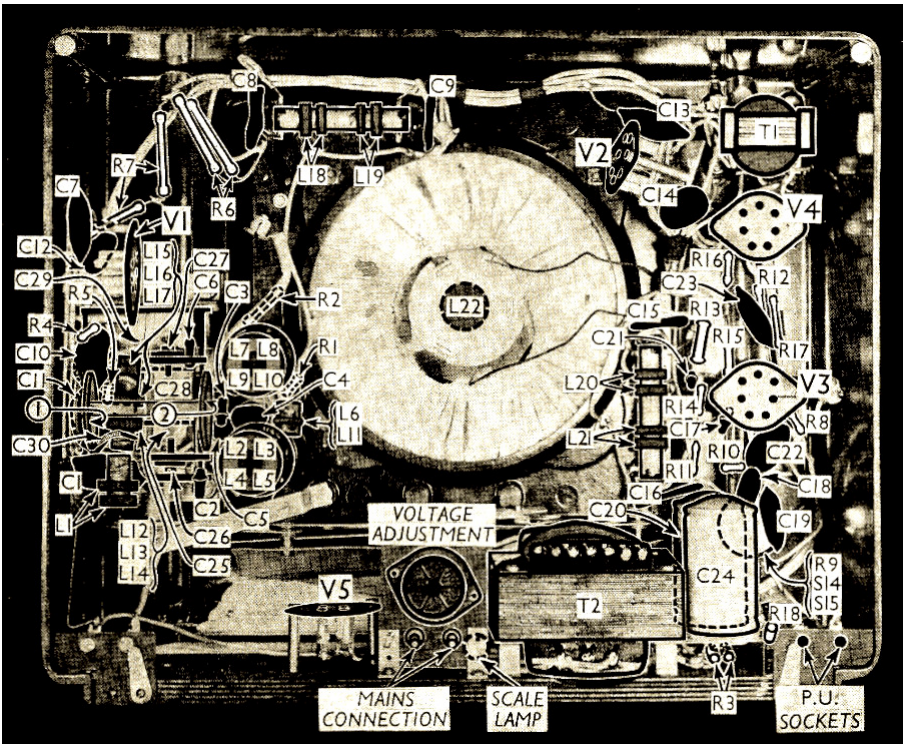
Final Thoughts. There are really no major hurdles in restoring one of these sets, and I wouldn't hesitate to take on another one.
Although the radio is attractive from the front, the startling appearance from the back is unique.
The layout looks more like evolution than design.

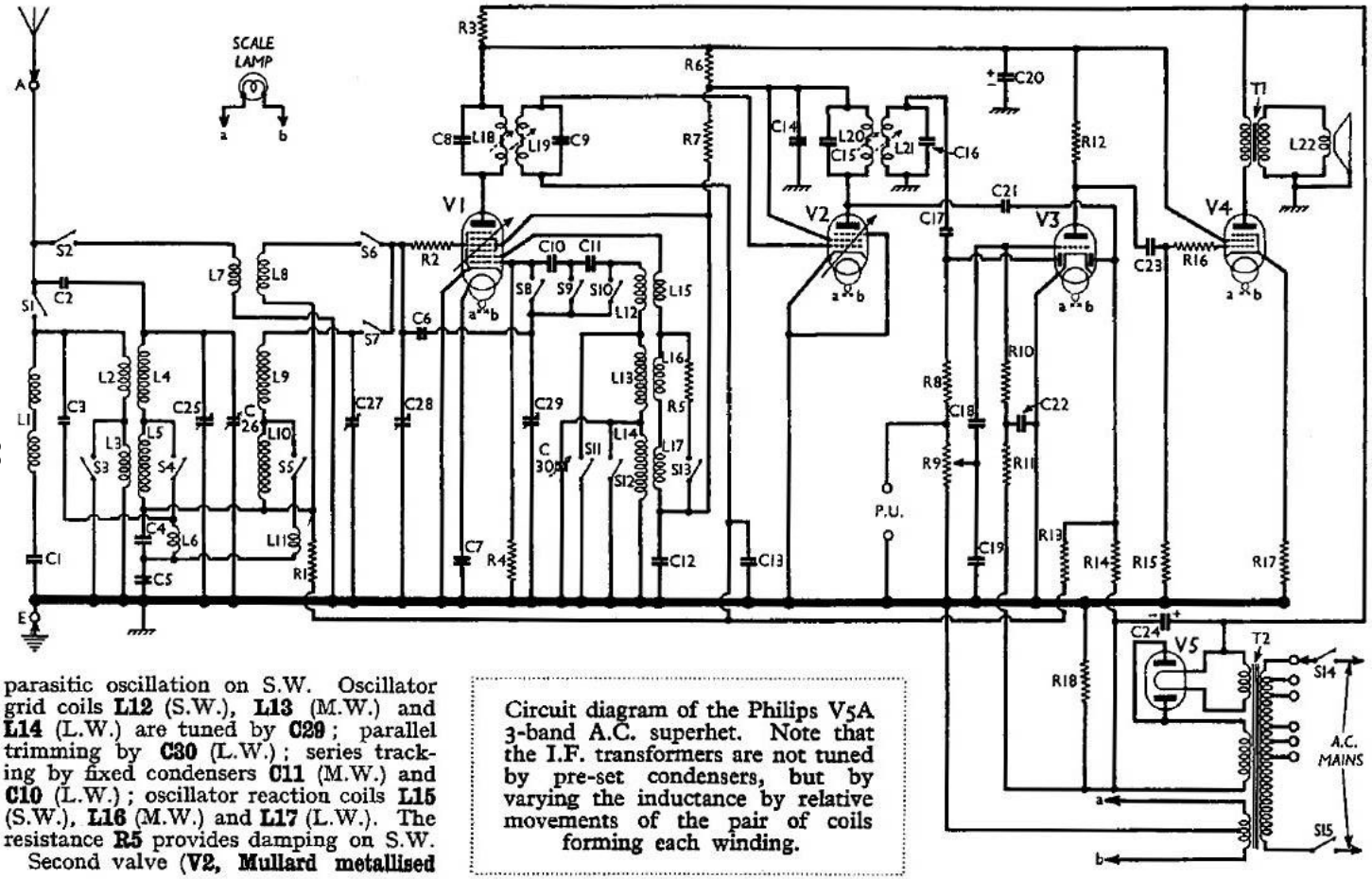


Above: Finished product.

Left: some original conditions.




C8
C9
C13
T1
R7
L18
L19
V2
C7
V1
R6
C14
V4
C12
L15
L16
L17
C27
C6
C3
R2
R16
C23
R12
C29
R5
L22
C15
R13
R4
C21
R15
R17
C10
L7
L8
R1
C11
L9
L10
C4
C28
L20
V3
R14
L6
L11
C17
R8
C30
L2
L3
L21
R10
C22
C1
L4
L5
R11
C18
C16
L1
C2
C5
C20
C19
VOLTAGE ADJUSTMENT
L12
L13
L14
C26
C25
C24
R9
SI4
SI5
V5
T2
R18
MAINS CONNECTION
SCALE LAMP
R3
P.U. SOCKETS



parasitic oscillation on S.W. Oscillator grid coils **L12** (S.W.), **L13** (M.W.) and **L14** (L.W.) are tuned by **C29**; parallel trimming by **C30** (L.W.); series tracking by fixed condensers **C11** (M.W.) and **C10** (L.W.); oscillator reaction coils **L15** (S.W.), **L16** (M.W.) and **L17** (L.W.). The resistance **R5** provides damping on S.W.

Second valve (**V2, Mullard metallised**

Circuit diagram of the Philips V5A 3-band A.C. superhet. Note that the I.F. transformers are not tuned by pre-set condensers, but by varying the inductance by relative movements of the pair of coils forming each winding.

A Customised Vintage Radio

by Peter McQuarrie

This is not a description of a restoration project in rebuilding a vintage radio to its original specifications, but rather about using modern technology to upgrade an old radio receiver to a higher standard. The objective was to take an old valve radio and customise it using current technology and engineering standards to improve the safety, efficiency and reliability of the resulting “modernised” radio.

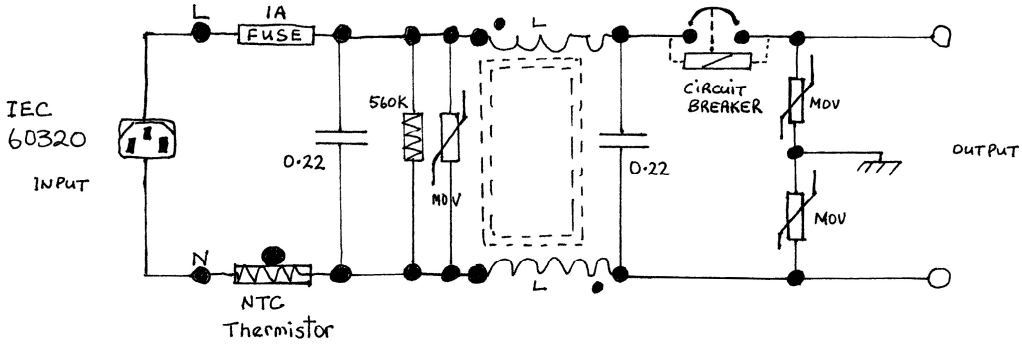
I chose a small, mains-powered, circa 1940’s receiver, using octal valves. This radio, brand-named “Westco” was apparently manufactured in New Zealand. It was not rare and neither valuable nor important in any way that it should be kept authentic.

The first area of the circuit to be redesigned was the power supply. In the original, the mains lead entered the set through a hole in the chassis. The lead was then tied in a knot before connecting directly to the mains transformer. There was no fuse or other over-current protection, no voltage surge protection or mains conditioning of any kind. The a.c. output from the power transformer was rectified by a 6X5 valve that is very inefficient by today’s standards, producing several Watts of waste heat.

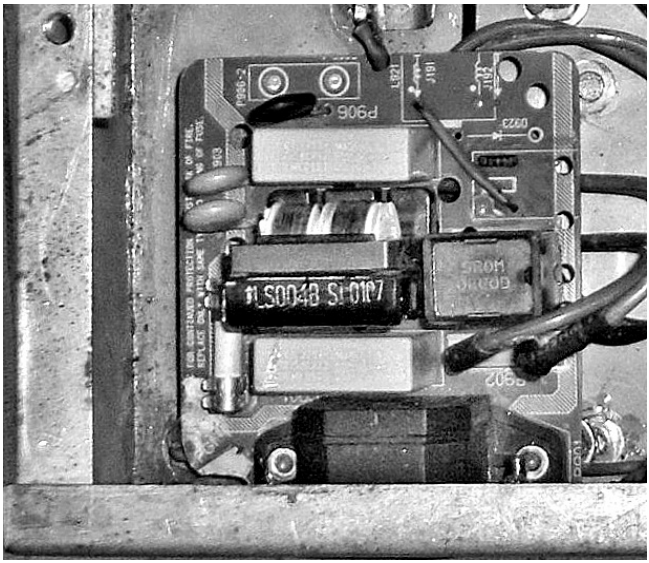
My solution was to connect the mains to the radio using the international standard, connector, commonly known as an “IEC Connector” (IEC 60320 C13/C14). This connector was developed by the International Electrotechnical Commission (IEC) as a power connector for detachable mains cords and is an example of a truly internationally used standard, adopted worldwide for use in personal computers and many other electrical appliances. By using this connector, the option of a wide range of mains leads in various lengths and colours became available for the radio.

From the mains connector the power is directed to a small power-conditioning PCB board. This provides the following functions: a Main Fuse, EMI/RFI filter, surge-arrestor varistors, soft-start thermistor, and a thermal circuit breaker. The EMI filter is a low-pass filter for 50Hz

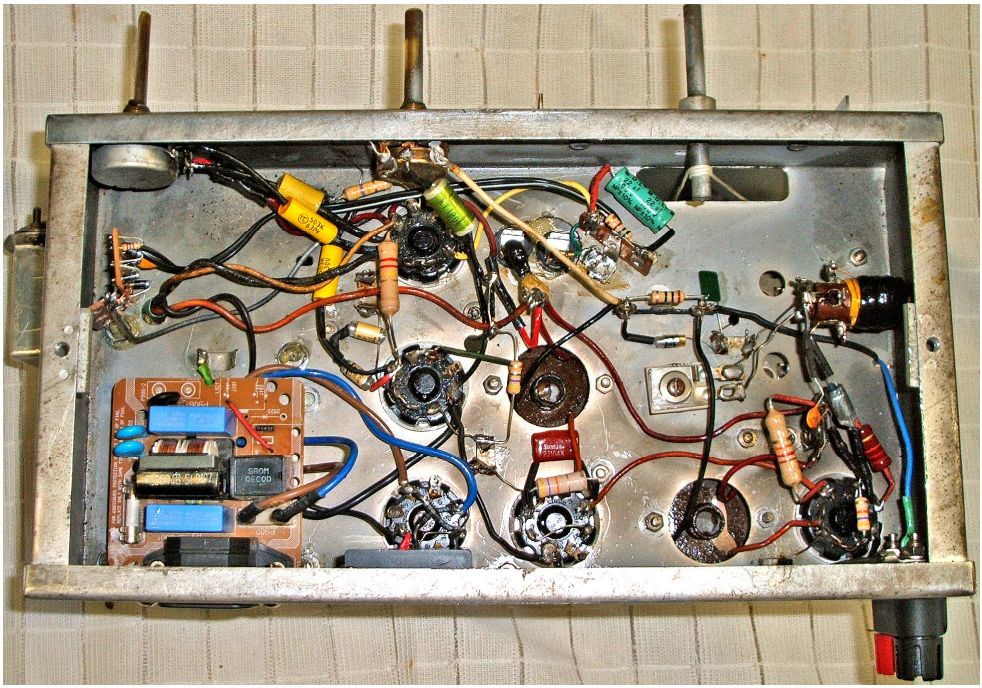
using two inductors and two capacitors. The metal oxide varistors (MOV) work in conjunction with this filter to reduce Common Mode (line to ground) surges and are far more effective in this configuration with a filter, than if used alone. The soft-start thermistor reduces the inrush current when the radio is turned on, especially important because I would be replacing the valve rectifier with silicon diodes.



It is a negative-temperature-coefficient (NTC) thermistor which offers a few ohms of resistance when cold but as its temperature begins to rise with the current, rapidly drops to approximately zero ohms. The self-resetting thermal circuit breaker disconnects the power should the load rise above 50 Watts. The use of this power-conditioning board greatly improves the reliability of the power supply by reducing the effects of voltage surges. It also reduces the risk of fire and lowers the risk of widespread damage to the radio in the event of a component failure.



To improve efficiency and reduce the amount of waste heat, I replaced the 6X5 rectifier valve with silicon diodes. I used a commercially made, solid-state, plug in replacement which fits the octal socket previously used by the valve. It would also be possible to make such a device by soldering diodes into an octal plug. A further improvement to the circuit was to replace the can-type electrolytic capacitor with a non-polarised, non-electrolytic, metalised-polypropylene capacitor which comes in a similar sized can. The new capacitor is far superior as it has virtually zero leakage current and a very much lower ESR (Equivalent Series Resistance, the measure of the total dielectric losses in a capacitor). In addition, it has extreme long-life and reliability compared to an electrolytic.



Finished refurbishment above and below

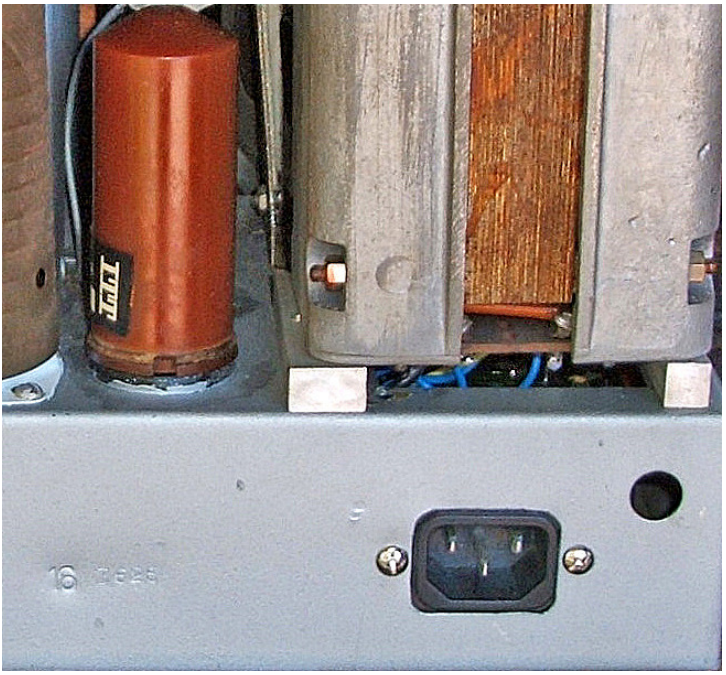
All the original capacitors and resistors were replaced with superior modern types of the correct value. For resistors I used high-stability metal film (1%) or carbon film (5%) types. For high-voltage capacitors I generally used polyester or polypropylene types and for low-voltages, mylar greencaps. For tuned RF circuits I used high stability polystyrene or npo-ceramic

capacitors. Modern npo-ceramics have superior tolerance and stability characteristics to silver-mica capacitors, at a small fraction of the cost. I used only two electrolytic capacitors in the radio; a bipolar 22mfd capacitor for the cathode bypass on the 6V6 audio output valve, and a solid-dielectric tantalum on the small PCB board used for the power supply to the LED dial light.

The original 1.8 Watt dial light bulb was replaced by a white LED of 0.25 Watt. This provides a very clean, white light to the dial, giving it a modern look, while using only a fraction of the energy. However, some people may prefer the very warm orange glow of the old incandescent bulb. It would of course be possible to use an orange LED or other colours such as red, green or blue.

The original radio consumed 42 Watts of power from the mains. When the modernising was complete this had dropped to 24 Watts, a 43% decrease in energy use.

This project was undertaken to explore ways in which vintage radios could be modified to meet modern safety and engineering standards and to improve their energy efficiency and reliability. It did not consider the questions of “if” and “when” vintage radios should ever be modernised in this way, or always preserved as original. Of course one could always make the mains-conditioning circuit as a separate, plug-in module which connected externally via the radio’s 3-pin plug.



Replacement plug-in (ITT) diode pack and IEC Connector on rear chassis

References;

IEC 60320 C13/C14, AC Power Connectors, International Electrotechnical Commission (IEC) and AS/NZS 1768, Lightning Protection.

A NZ Meccanoman's History

As a 20 year old, Arthur Vernon (Vern) Butcher crafted on of the most inventive Meccano models ever built in NZ; the Robot Radio Receiver Clock. The second year Christchurch engineering student's *piece de resistance* was twelve months in the making with late 1930's wire and solder radio technology. The brain of the contraption was a Meccano solenoid operated series of lockable switches that programmed frequencies in the radio – all under the control of a timeclock.

The "Robot Brain" was the original idea of Vern' patent application of 1939

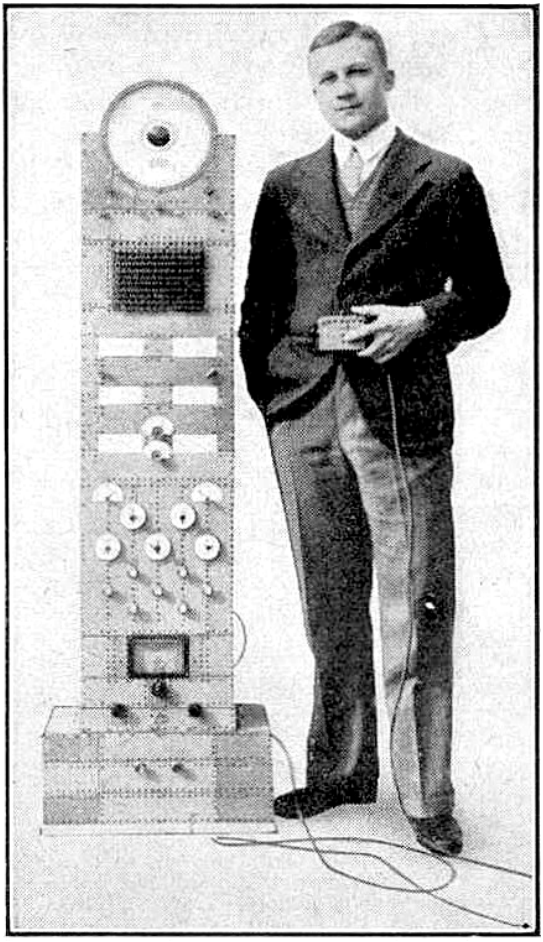
The whole radio earned Vern the first prize in the Meccano Magazine 1940 autumn model building competition for which he was awarded £5/5/- (approx $440 inflation adjusted today) and featured with the picture on right.

The "Clock Radio" details were summarised as "about 5 feet tall, containing four electric motors, about 20 relays, more than 2000 nuts and bolts, and took about 12 months to complete."

A series of controls could be preset to give a whole evening's entertainment from different radio stations – automatically switching to the desired station at the appropriate time.

The radio featured a clock indicating time in any part of the world, a short wave indicator field which lit up when English programmes were available from Germany, France England etc, five controls which preselected radio programme start times, a radio built by Vern for medium wave and short wave stations, a pushbutton manual station selector and a wired remote control for station selection and volume control.

The radio was displayed on a stand at the Local Industries Fair and the Christchurch newspaper of the day noted that Vern's objective was to derive "some entertainment and instruction from work".



Pix of Vern and his Robotic Radio

Nigel Boyle of Christchurch's Old Toy Market, interviewed Vern when in his late 80s and wrote an overview of his life in the NZFMM (Meccano Magazine) Vol 28, issue 5, October 2004. By then Vern was suffering motor neurone disease but gave an extremely modest account of his achievements.

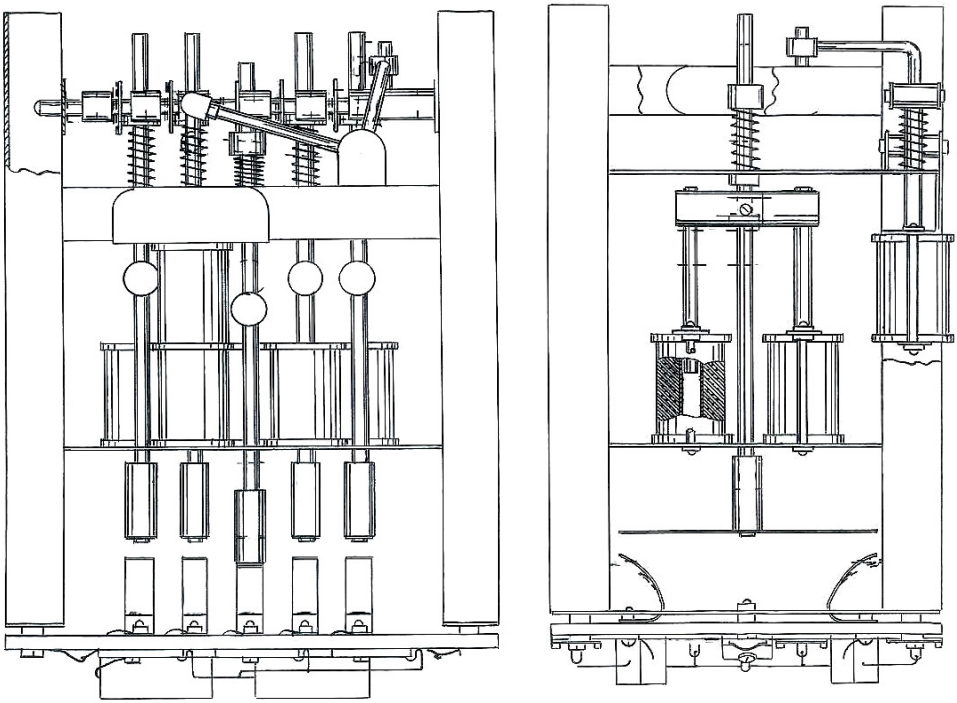
Vern, a Kaiapoi lad, started out as an early Meccano constructor from age 9 when he collected and sold birds' eggs (4d per dozen sparrows, 3d for thrushes and blackbirds) to the old Eyre County Council under an 'introduced bird control programme' in force until 1928. Vern would

travel to the Meccano shops of Christchurch when the kitty reached a suitable threshold – often supplemented by his grandmother.

His early days of constructing won him several international prizes with Meccano Magazine (UK); 1935 Gold Dredge 2nd prize, 1936 Campbell's Land Speed Record Racer honourable mention, 1937 Gyrotiller 1st prize, 1937 Carpet Sweeper 3rd prize, 1938 Thistle Cutter 1st prize, 1938 Harvester 1st prize, 1939 suggestion Slip Clutch, 1940 Automatic Radio Receiver Clock 1st prize.

The radio used Meccano solenoids to select pairs of capacitors to tune the selected radio station and automatically disengage the previous selection. There was no need to get up to twiddle for stations, the remote control allowed easy armchair listening all evening. The invention drew interest from the radio industry of the time including Radio Corporation and Collier and Beale, so the idea was protected with a provisional patent (dated 25 July 1939) titled "Improvements relating to the tuning of radio receiving sets". However war created diversions and the blueprints were mothballed. Vern Butcher joined the Air Force, trained as a radar technician and became a Flight Lieutenant in charge of mobile radar units in Italy. On return to NZ, after hostilities, he joined the NZBC and became Supervising Technician, Sound Maintenance in Christchurch.

The early arrival of transistors saw Vern making portable radios in his spare time – "decent radios – demand was there for as many as I could make". There was one still in use in Vern's kitchen while Nigel conducted his interview in the 2004. Sadly, Vern died within the year.



Above left view, the locking solenoid operated radio tuning capacitor selection "brain". (Once a solenoid operated it was locked in position). On right, the release solenoid, details of the solenoid activators and lower, details of the dual capacitor selection link "switch". Capacitors at bottom.

Early NZ Radio Stations and Studio; 2YA and 3ZC

Any stories or technical information would be gratefully received.

MARKETPLACE

Advertisements for the next bulletin should reach the editor by the 15th of the prior month. These must be neatly hand printed, typed or printed on a separate page, posted to the NZVRS (for details see page 2) or emailed to *nzvrs@pl.net*

Please - no verbal or telephoned adverts, also don't forget to include some contact details; eg postal, telephone & email if applicable. There is no charge for members' adverts but please remember that the NZVRS is not responsible for any transactions between members.

AVAILABLE

Valve Cartons – plain white flat packs

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

Plus post and package per order.
Contact: Paul Burt, 44 Hastings St West, Christchurch 8023.
Tel: 03 - 960 7158, Mob: 021 0245 0084
Email: **dawn.lloyd@clear.net.nz**

Society Sales:

NZVRS CAPACITORS for sale to members only please order via Gerry Billman, 30A Rowan Rd. Epsom, Auckland 1023. Email: **billman@ihug.co.nz**
Tel: **09 - 625 6568**

Metal polyester film, axial leads, (µF):

0.01	630 Volts	50 cents each
0.022	630 Volts	50 cents each
0.033	630 Volts	50 cents each
0.05	630 Volts	50 cents each
0.1	630 Volts	50 cents each
0.22	630 Volts	50 cents each
0.33	630 Volts	50 cents each
1uF	400 Volts	$1.00 each

Electrolytic capacitors, **polarized**, axial

10µF	450 Volts	$1.50 each
20µF	450 Volts	$2.00 each
40µF	450 Volts	$3.00 each
47uF	450 Volts	$3.50 each
100µF	450 Volts	$5.00 each

Lamps 6.3 volts 150 mA (low wattage)
MES & Bayonet 50c each
Please add $3.50 per order for post & package or contact Gerry direct for a postage quote.

Power plugs (Tilley white plastic type with unprotected brass pins) available at 50 cents each plus $4 post and package per set of 4 (ie $6 for set of 4, posted to an NZ address). Contact the NZVRS Secretary Paul Woodcock, 2 Levy Road, Glen Eden, Auckland 0602.
Email: **paul.woodcock@opus.co.nz**

One only of the following available (NZ postage included) to NZVRS members:
Book 1: **The AVO Valve Data** Manual 15th Edition (1963). Suitable for Mk4 AVO. $30 NZ p&p included.
Book 2: **The Golden Age of Radio** in the Home – by John Stokes, new old stock $30 NZ p&p included.
Book 3: **ZB the voice of an iconic** radio station by Bill Francis. $20 NZ p&p inc.
Book 4: **Bakelite Radios** by Robert Hawes $30 NZ p&p included.
Book 5: **RSGB Radio Communications Handbook** 4th edition (1968) $10 NZ p&p included.
Contact NZVRS Treasurer David Crozier PO Box 13873 or Email: *nzvrs@pl.net*

All Society Sales cheques to be made out to the "NZVRS" and crossed "Not Transferable" please. Direct banking options are also available to the NZVRS ASB bank account – see bottom of page inside front cover.

WANTED:

Hallicrafters SX 28, RCA AR88, R1155 and Eddystone 940 receivers wanted.
Contact: Ray Devereux
Email: **raymond.d@clear.net.nz**
Tel: 03 684 9089 (Timaru)

Wanted to buy: 1 x **EBF35** double-diode-pentode - usually sporting a metallic red suit. New (NOS) preferred but used would be OK as this is going into a Perspex Radio appearance is important as well as performance.
Contact: John Roberts, 1 Moana Road, Kelburn, Wellington 6012
Tel: 04-977 7595
Email: **Pentagrid@paradise.net.nz**

Wanted for restoration projects, **R-25 / ARC-5 receiver** - 1.3-3.0 MHz. Also I would like a **BC-348, 28v dynamotor** unit complete and suitable for restoration.
Contact: Stu Stidolph, 3/15 Gebbie Road, Taradale, Napier 4112. Tel: 06-844-5591
Email: **stustid@paradise.net.nz**

WANTED

- **Filter choke for Eddystone** S680/2 receiver (condition immaterial).
- **Beacon R05F power transformer** 4 bolt version please.
- **Set of test leads or 5mm banana plugs** to fit Windsor Model 71 multimeter.
- **Tone switch assembly for AK P216** radio.
- **Service data for Dual 701 (CS70) turntable.**

Contact: Ross Paton 1/54 Glengarry Rd, Glen Eden, Auckland 0602.
Tel: 09- 818 8274

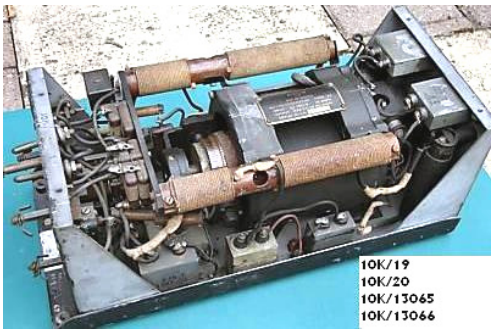
AVAILABLE

Available: Radio Limited model RO, large table radio, late 1940's, lots of SW spread bands, 6 or 7 Loctal valves including tuning eye. Radio in fair condition physically, electrical condition untested.
Contact: Ross Paton 1/54 Glengarry Rd, Glen Eden, Auckland 0602.
Tel: 09- 818 8274

Available for restoration **Ferrograph series 7 and Truvox PD204 tape recorders**, both 3 speed 4 track recorders.
Contact: Ray Devereux
Tel: 03 684 9089 (Timaru)
Email: **raymond.d@clear.net.nz**

WANTED

10K/19 Rotary Power Supply



I am looking for a rotary transformer plus filter circuit assembly Type, 10K/19, or 10K/20 or 10K/13065 or 10K/13066 and was wondering if anyone had one they were willing to part with? These are dual power supplies containing a rotary transformer that supplies 217V at 110mA and 7V at 13A, all contained in a metal box slightly larger than a shoe box with Jones plug connectors at one end. These are quite heavy units weighing about 17kg. Any help will be greatly appreciated. Thank you.

I have enclosed a photograph (above) of one of these units with the lid removed showing the rotary transformer and filter circuits.
Contact: Ian Thompson, 105 McKays Road, RD1, Christchurch 7671.
Tel: 03-318 1656
Email: **ian.thompson@taitradio.com**