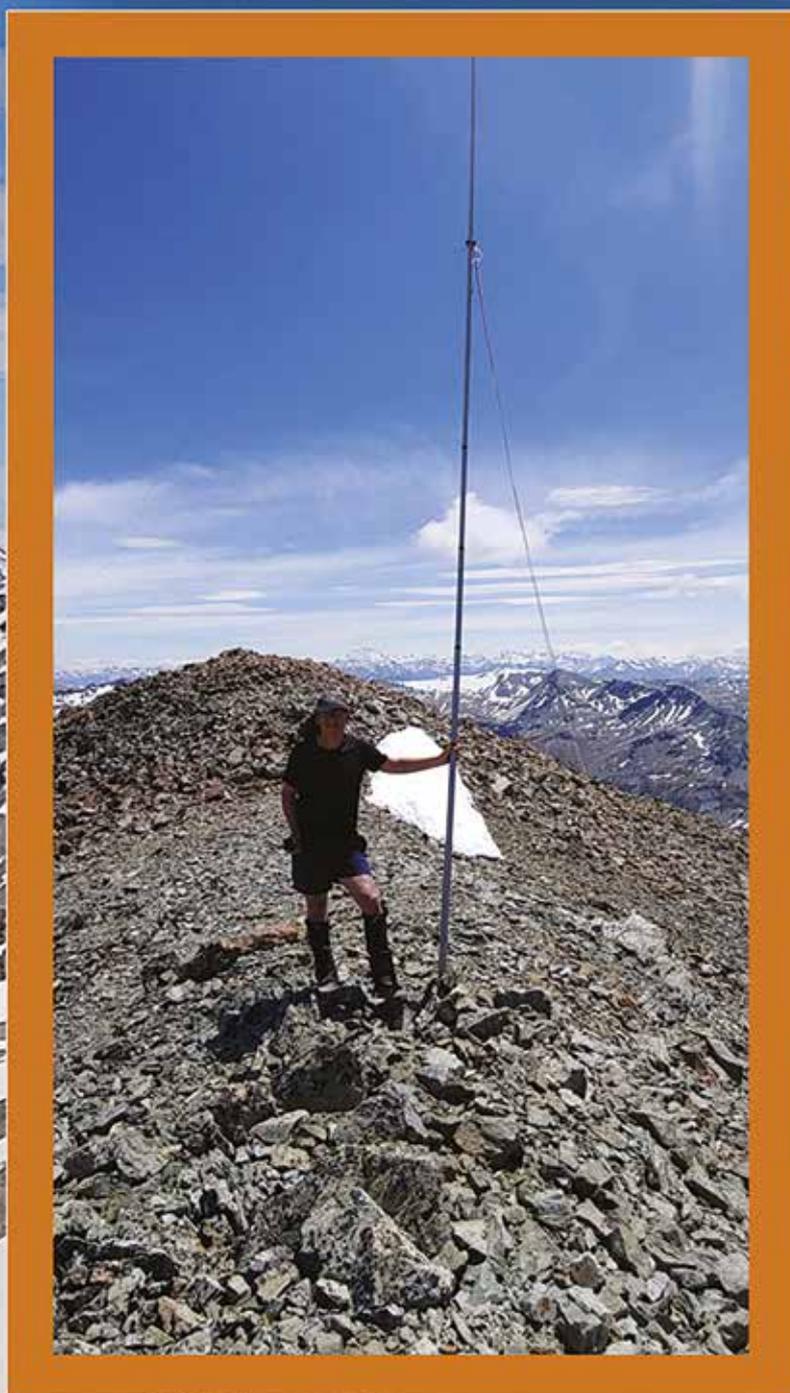


# BREAK IN



The Official Journal of the New Zealand Association of Radio Transmitters (Inc.)

Volume 93 Number 1



- » Inverter generator HF Interference: A solution to the noise
- » Wireless ZC8: A number eight set for New Zealand – Part 2
- » ZL3AC VHF Field Day Contest 7/8 December 2019
- » ZL and the art of Direct Sampling
- » The Find
- » The First ZL to VK Contacts on 10 GHz at 2040 Kilometres
- » The State of 6 m in ZL in July 1997

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# BREAK-IN

The Official Journal of the New Zealand Association of Radio Transmitters (Inc.)

Volume 93 Number 1

(The term break-in refers to a system in CW whereby the transmitting station can hear the other station's signal during "key up" periods).

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### Youth Officer:

Vacant

## From The Editor

Mark Gooding ZL2UFI

<editor@nzart.org.nz>

### Call Book 2020

After that latest *Call Book* was sent out some errors appeared to have gotten through the proof reading process. I am sure that these will be corrected in the 2021 issue, especially the information around branches.

Some people have commented on the number of Silent Keys still listed and those gone no address. Remember it's your responsibility to inform your relatives about your call-sign and what you want done with it, perhaps a foot note in your will be a good idea!

For those not keeping their address updated with RSM and NZART HQ, again this is your responsibility, *Call Book* is just highlighting the fact to you all.

### Youth Report

In this issue you will read the last Youth Report from Xenia ZL4YL, as she signs off and commences several years of study at University. I wish to thank Xenia for her reports and articles on the youth activity. Is there another young amateur under the age of twenty five who would take the role? Contact me for any information you require.

### Annual Reports for 2019

Just a reminder for those people that your Annual Reports for 2019 are required for the next issue of

*Break-In* – March/April 2020. Close off for this issue is 10 March 2020, so if you haven't already submitted them then you'll need to get a crack on!

### Writing for *Break-In*

Once again I'd like to take this opportunity to remind potential contributors of a few do's and don'ts regarding submission of articles for *Break-In*.

- Received copy will normally be acknowledged within 2-3 days.
- All copy has to be reformatted into a format suitable for typesetting. Preferred formats are Word.doc, \*.docx, \*.rtf or \*.txt. MS Publisher files cannot be used and I ask that you do not send textual copy as \*.pdf files since these lead to a lot of unnecessary extra work to convert them back to \*.doc files.
- Photos and graphs etc should be sent as separate discrete files; NOT embedded in the text.
- Emailed copy should be sent as separate attachments and not as part of the message text.

Thanks for your cooperation.

I expect that you are all now over Christmas and New Year, and looking forward to yet another year of enjoying this great hobby. Don't forget to make plans for the NZART Conference this year.

Mark Gooding ZL2UFI  
Editor



Next deadline for copy is  
10 March 2020

## NZART Education Trust

Grants available for Education in Radio science at all levels.



- Prizes for School Science Fair.
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(see <<http://www.nzart.org.nz/nzart/trust/>>)

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**Do you have an idea for an article for *Break-In* but are not sure where to start?**

**Your Editor can put you in touch with someone to help you get started!**

**Contact the Editor at  
<[editor@nzart.org.nz](mailto:editor@nzart.org.nz)>**

# From The President

Mark Gooding ZL2UFI  
<zl2ufi@nzart.org.nz>

## End of the Old Decade

Over the Christmas/New Year period I came across this quote in a non-amateur newsletter that I had received.

*When you do nothing, you feel overwhelmed and powerless. But when you get involved you feel the sense of hope and accomplishment that comes from knowing you are working to make things better. Maya Angelou an American poet (1928-2014)*

So, let's take this quote into the new decade and make it better than the last.

## Beginning of the New Decade

This year NZART will be looking for people to step up or volunteer for roles within the organisation. One such role advertised in the last *Break-In* of 2019 and again in this issue is that of the Local Government Liaison Officer or LGLO. One of the constant complaints I hear is *What is NZART doing for me?* This very important role needs to be done by NZART as it's the only national organisation which represents all amateurs. I again implore you all to consider whether you can assist to take this role on, or other roles as they become vacant and provide back just a little to this great hobby you enjoy. I am sure that Douglas ZL1BFS would love nothing more than to assist you into this role.

NZART will celebrate its 100th Anniversary in 2026 (16 August 1926), so we have much to look forward to.

## New Office Assistant at NZART HQ

As outlined in my previous column and included in this issue is the advertisement for a new paid role of Office Assistant at NZART HQ. This role although causal and part-time is to provide a degree of resilience and additional support when required. If you know of a person who maybe suitable for this role then please have them read the advertisement and make an application.

Council expects to appoint a person within the next few months.

## Resignation from Council

As announced in NZART InfoLine

and the Official Broadcast Councillor Phill Dodds ZL4XYZ has chosen to resign from Council; this was effective from Thursday 21 November 2019. He made the decision after realising that he had spread his time amongst NZART Council, local radio projects, his interest in military vehicles, a new job and family life too thinly to really do justice to any of these interests well. He said that he had to give some things up, to ensure that he had time to enjoy all the things he wanted to do, especially to spend more time with family.

After speaking with Phill he decided that the time was right to leave Council. Phill will continue to remain a member of NZART and support it but in a lesser role. Phill expressed that he would in the future like to return to Council once he has completed a number of the projects he has committed to. I thanked Phill for his service and wished him well for the future.

## Appointment of new a Central Region Councillor

NZART Council at its December meeting approved the appointment of Richard Harkett ZL2FY as a Central Region Councillor. This appointment is as a replacement for Benjamin Isaacs ZL2BCI who resigned in November. Richard became an amateur in 1973 while still at school and joined Palmerston North Amateur Radio Club, Manawatu Branch 20 NZART. He later joined the New Zealand Post Office as a Radio Technician, and later he joined the New Zealand Police. While with the Police Richard completed his NZCE (Telecoms), running a number of radio communications projects essential to the running of the Police radio network. Richard retired from the Police in 2014. He is a current member of Kapiti Branch 69 and resides in Paraparaumu.

I welcomed Richard to NZART Council, his appointment was confirmed at the NZART Council December meeting.

On Saturday 21 December 2019 I attended the Kapiti Branch 69 meeting where the branch took the

opportunity to ask a number of questions about NZART and its future. This informal talk also allowed me to receive feedback on some issues that members of the branch had. It was a very pleasing exchange of ideas and I welcome this approach. Just prior to the end of the meeting I presented Richard with his Councillor badge.

## Vacancy: Central Region Councillor

NZART Council is now seeking nominations from the Central Region for the role of NZART Councillor to replace Phill Dodds ZL4XYZ. If you wish to join NZART Council please forward a short CV to Debby at NZART HQ via email to: <nzart@nzart.org.nz>.

Under *Part 3.7 Vacancies on the Executive Council*, of the NZART Constitution; NZART Council will make an appointment to the vacancy created from the recent resignation in due course.

## 6 Metre Liaison Officer Role Disestablished

In October of 1994 Bob McQuarrie ZL3TY was appointed by NZART Council to take on the role of the 6 Metre Liaison Officer. This appointment was later announced in the *Break-In* of December 1994 (see the article elsewhere in this issue). Bob contacted NZART Council in early December 2019 where he recommended that the position be disestablished as the role was no longer required. Bob stated that *the position was created at a time when our access to the 50 MHz band was threatened by the Government's intention to sell TV management rights. Now that analogue TV has vacated low band TV frequencies and we have unrestricted access restored there is no reason to retain the position.* On behalf of NZART Council past and present I express my thanks to Bob for his twenty five years of service in this position. This role has been disestablished as of 31 December 2019.

## Conference 2020: Greymouth/Shantytown

As a member of the Conference Organising Committee, please view the Conference web site at <www.nzart-conference.nz> for updates. Also, on this web site is the ability to sign up or read past Conference

Newsletters, a great way to stay in touch with what is going on. These Newsletters are set to come out every three weeks.

NOTE: that those with motorhomes cannot park at the Conference venue of Shantytown overnight, and will need to make alternative arrangements for their vehicles.

## Wellington Maker Faire 2019

Just to set the record straight, that the budget from NZART of \$1000.00 towards this event has not been taken up by those organising it. This was not an NZART event but one partially sponsored by the above grant. Also supplied and used on the day was NZART collateral consisting of past *Break-In's*, *Call Books* and NZART promotional pamphlets, along with NZART Branch and AREC banners. This support was agreed to at the Monday morning Council meeting after the New Plymouth Conference in June 2019. It seems a pity that recent comments have failed to mention the sequence of events as outlined in the Council Minutes.

*"Never let the truth get in the way of a good story."* — Mark Twain

## Over the Horizon Radar (OTHR)

Are you looking for a challenge of something new to do? Have a read of John ZL1GWE's column in this issue on the Monitoring Service, and give back to amateur radio worldwide. Why not do your bit and send reports to John, or take the challenge to set up your own KiwiSDR <www.kiwisdr.com> to assist in this vital role? This is another great example of not only NZART Officers doing something, without much support but again something you can do. I can only applaud John's efforts in this role.

## Final word

At the end of the last year there seemed to be a huge social media comment about a number of things that NZART was or was not doing. It's a pity those people putting so much effort into social media (when I am too busy to assist NZART?); if only this was directed into helping NZART, no doubt we would all be better off!

Mark Gooding ZL2UFI  
President

# Inverter generator HF Interference: A solution to the noise

By Alastair Christie ZL2ARC <alastair.christie01@gmail.com>

**CAUTION: 230V AC from a portable generator can be lethal. Be careful! The filter described in this article is NOT intended to be used with reticulated mains electricity as the protective earth has been deliberately left off. Do not plug into a household wall outlet!**

## Introduction

Some years ago I purchased an inverter generator. One of its use cases was to power my high frequency (HF) radio equipment at sites with no AC mains electricity available. This was initially tried with very limited success on 80 m, only very strong signals could be heard over the RF emissions from the switch mode inverter circuitry within the generator. Recently I've noted from articles in *Break-In* that other, mostly field day operators have experienced this problem with their inverter generators as well. In this article I will explain how I solved this issue with the addition of extra filtering and have since used my 'smart throttle' inverter generator to power a field day station on more than one occasion without degrading the 80 m and 40 m station noise floor.

## Advantages of an Inverter Generator

There are two main advantages of this generator technology.

- Much better fuel economy. I estimate between 30 - 40% less than a conventional petrol generator that runs at a constant engine speed to maintain 50 Hz.
- Better power to weight ratio and therefore easier to carry on site.

Like any technology there are advantages and disadvantages, and in this case a big advantage is improved fuel economy. This is achieved by varying the engine speed depending on load with voltage and frequency regulation being maintained by switch mode inverter circuitry. This provides very stable frequency and voltage regulation even though the engine speed is constantly varying due to changing load. However the disadvantage of this system is the high radio frequency (RF) interference conducted from the generator making HF operations almost impossible.

## The Problem

Insufficient filtering of the 230V AC within the inverter generator means high frequency switching noise from the switch mode inverter circuitry is conducted from the equipment via any extension cord plugged into the generator. Additionally any length of extension cord will act as an antenna radiating the noise causing electromagnetic interference (EMI).

At higher frequencies the generator itself may radiate RF interference without anything plugged into it while running.



*Inverter generator is powering equipment without any filtering; noise is S8!*

## Working towards the solution

The first test was to check that the generator itself didn't radiate significant RF interference on HF bands of interest. It was placed under my 80 m HF receiving antenna with a 100 W incandescent light bulb load connected via a very short lead. The generator was started. No RF interference was detected.

Connecting the load as above but at the end of a long extension cord lead to S8 interference on my HF receiver. Following this an extension cord on a spool was plugged directly into the generator followed by another cord connecting to the load a



*Experimenting with a coiled extension cord as a way to reduce the noise*

few metres away. A reduction in the noise was noted but not enough to really make 80 m useable in a low

noise rural environment.

From the tests above I concluded that with sufficient filtering right next to the generator HF operation is likely to be possible. From these tests I concluded that much of the generator interference was of a common mode nature and a common-mode choke right at the generator output would solve the noise problem.

## The Solution

To solve this a common-mode filter consisting of two components was needed. For a commercial AC mains filter, I used one made by Yunpen, part number YC10T1L2, though other suitably rated filters could be tried. A quick Internet search will give many options.



*Filter construction; note twisted blue & brown wires.*

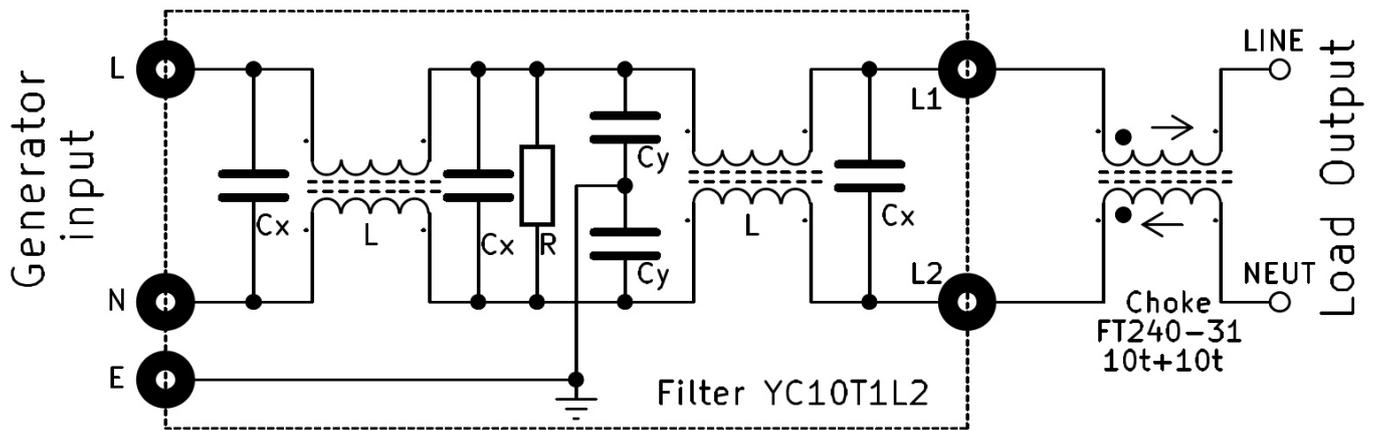


Figure 1: EMI filter schematic.

A large common mode choke made by winding 10 turns evenly spaced onto two FT240-31 toroid cores. Calculated inductance is 630 uH. The plug and socket are from a short extension cord. The wire wound through the toroid cores is simply the extension cord blue and brown conductors with the outer white sheath removed.

#### Why no earth connection

The output of a portable generator (or isolating transformer) is floating and neither live wire will be linked to earth. This means you can touch either conductor with low risk of electric shock. However should you touch both conductors at the same time you will receive an electric shock!



Filter plugged into generator at field day site

The large common-mode inductance of the filter ensures a high impedance to the high frequency electrical noise thus attenuating the noise conducted out of the generator which is mostly of a common mode nature while providing a low impedance path for the differential AC voltage.

The metal case of the commercial filter is connected to earth of the plug that plugs into the generator. The output socket of the filter has no protective earth connection as this wire would conduct RF noise if connected straight back to the generator. See photograph 3.

If equipment with a metal enclosure plugged into an isolated source develops a fault that allows one of the live conductors to contact its metal enclosure it would still remain safe as there is no path via ground to complete the circuit.

The filter described in this article is **NOT** intended to be plugged into a mains electricity supply and should **NEVER** be used this way as it has no protective earth. It is designed to only be used with an isolated power source such as a small generator.

#### Finally

The filter described in this article has been used over two field day



Generator powering the equipment through filter as shown in photo 4. Noise is not registering on S-meter.

weekends with excellent results. The 80 m and 40 m receiver noise floor was not degraded by the inverter generator even in a quite

rural location.

For a wide range of toroid cores see: <[www.kitsandparts.com](http://www.kitsandparts.com)> ¶

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# Wireless ZC8: A number eight set for New Zealand – Part 2

By Kelvin Barnsdale ZL3KB

Originally published in *Radio Bygones* June 2015

Adapted for NZART Break-In.

In part one of this article, we looked at the origins of this unique, New Zealand made back-pack radio from the second world war. In this second part we will see how one example, now over seventy six years old, was resuscitated to warm the airwaves again. Breathing life back into its circuits without damaging its authenticity is a delicate path to tread.

## A surviving ZC8

I received this ZC8 example, serial number 54, from a long deceased estate of a Christchurch ham radio operator, and on initial inspection it appeared in clean condition, but with few accessories. It had no headphones or aerial, except for the base. To help me through the restoration, I fortunately had the instruction manual and circuit diagram.

However, a nasty surprise was waiting for me when the battery compartment was opened, it became evident the internal foam padding had decomposed into a molten “goo”, covering the internal headphone/battery connection cable, and the microphone that had been stored in there too. Resembling a sticky, black pitch like substance, it was obvious I had to clear this mess as the battery cable was trapped, which prevented the removal of the radio chassis.

Some thought was given to my approach to this restoration, and the only way forward was to try the removal of this mountain of goo, with microphone, in one lump.

Using a trick I use when removing large globules of hot melt glue, I heated the bottom of the case with a hot air gun to melt the interface between the “goo” and the metal, and theory says the bulk would just lift away. It partly worked, allowing the cables to be pulled clear, and the microphone and plug be removed, albeit in a gummy black mess.

Many hours of scraping later, with several applications of petrol, methylated and white spirits, and with hands ingrained with sticky bitumen, the battery compartment was looking better, the microphone and plug was rescued (hooray), but unfortunately the cloth covered cables were “a goner”.

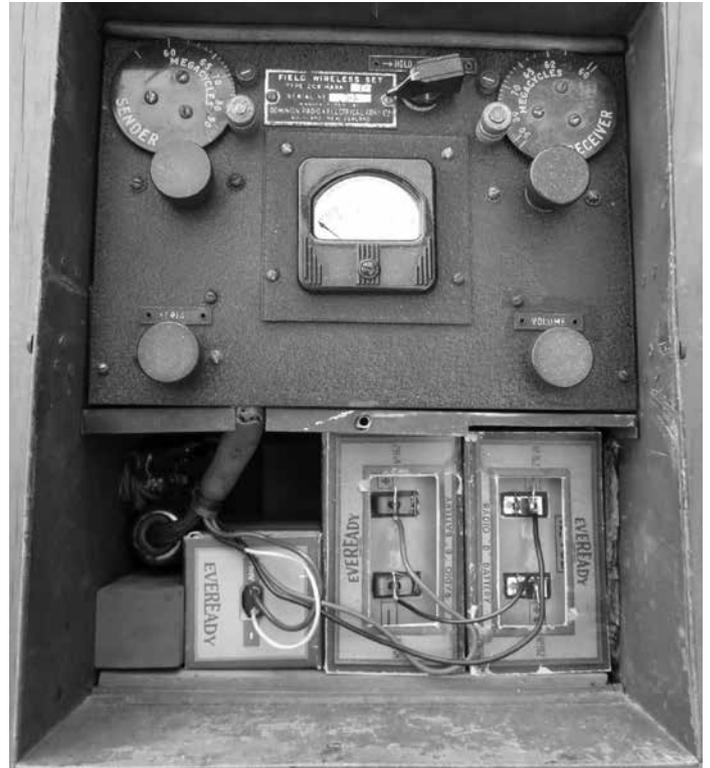
## The radio chassis is freed

Once the battery/headphone cable was released, the radio was removed from the case, this time revealing a pleasant surprise. The chassis and components were in excellent condition, and looked like it had not been touched since it was made. However, the rubber insulation of the wires had suffered from old age; when the battery and headphone wires were moved the rubber insulation cracked and disintegrated like an Egyptian mummy. Therefore the first job was to replace these in a way sympathetic with the original construction. I looked for rubber covered wire with no luck, so I used a silicon insulated wire which had the same “feel”. Strangely, the old battery wires had no evidence of plugs, indicating the batteries used (Eveready 762 HT and C116 LT) had screw terminals or clips.

As the mechanical remote control cable was missing, I fabricated a shaft and knob to fit into the side of the set chassis, so it could be activated manually.

With the power cable repaired, I made some careful measurements of the supply resistance. All looked OK but an intermittent connection was found in the power contacts of the main wafer switch, and that was buried deep behind the front panel. The only thing that could reach it was switch cleaner spray. Luckily, after a tsunami of “no more dodgy contacts”, the connection eventually came right, but the low quality wafers will forever be saturated.

When trying to gain access to the wafer switch, I removed the meter plate from the front panel. To my surprise, this revealed the meter had never had any nuts fitted to its connections, with the meter shunt just pushed onto the threads; this



Front panel TX top left, RX top right, net switch top centre, aerial tune and volume at the bottom.

must have been a rush job! Risking detraction from originality, I fitted some 4BA nuts, tarnished brass of course.

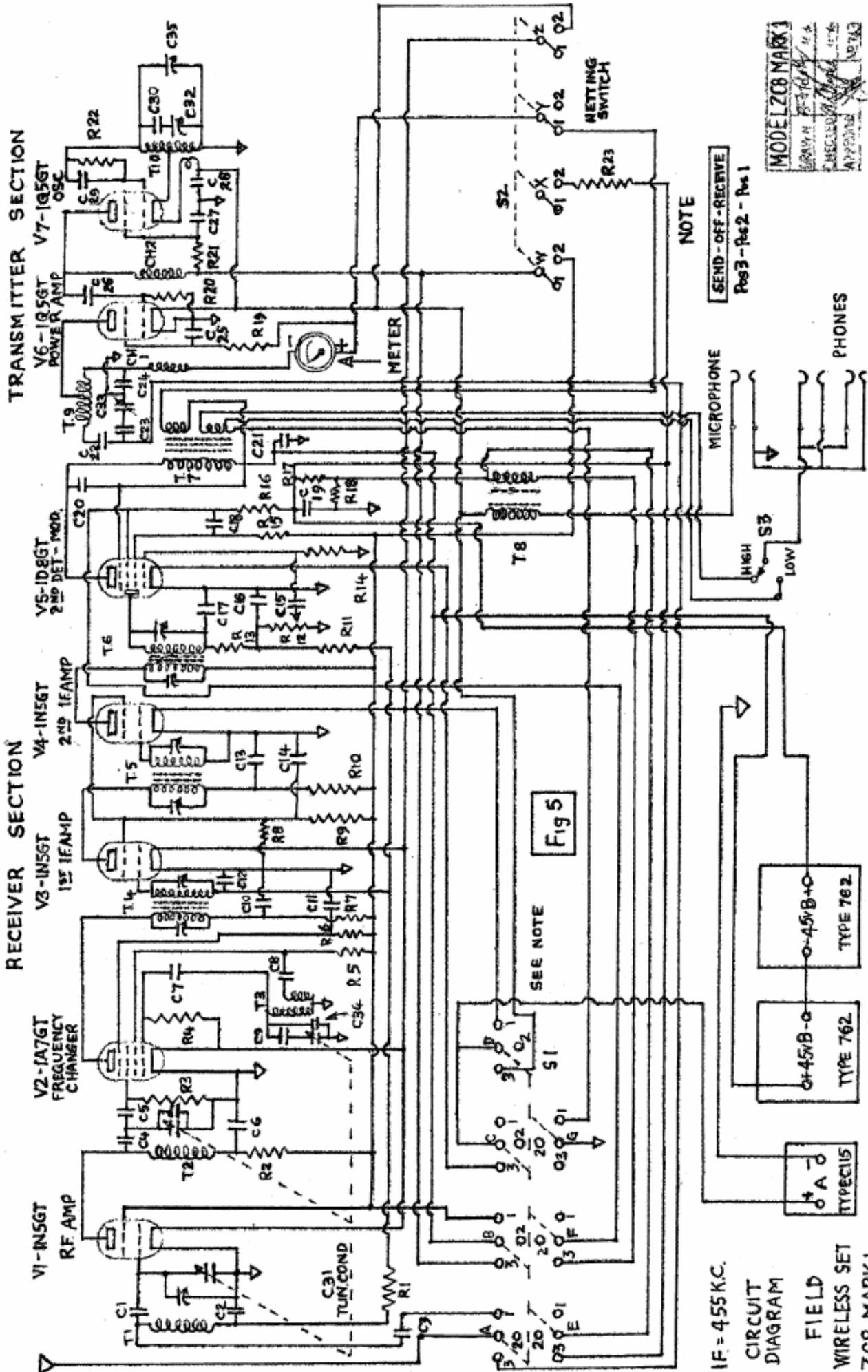
## Now for the receiver

A jammed volume control was a fault evident from the moment I received the set, so this was the first job to be addressed. The knob was removed, thankfully the grub screw did not fight back, but no amount of twisting would rotate the shaft. Despite the connecting wires being very brittle I carefully removed the pot and removed its back plate. It was a design I had never seen before. The wiper was not a contact, but a fibre button pressing on the inner surface of a steel ring, which in turn pressed onto the carbon track. This seems a great idea as there is no wiping action to wear out the track. Much disassembly was needed to eventually find that the shaft was seized into the bush, but when it was extracted no sign of seizure was seen, just shiny metal like it was born yesterday! It

was reassembled with a dab of grease and it worked like new.

I have some self imposed rules when restoring old radios; in the interest of maintaining historical integrity, I always try to minimise the disturbance to the set when “getting it going”. For instance, I never change components unless they are proven bad, I never disturb solder joints or their inspection paint unless there is no alternative, and when changing components I always leave the original connected by one leg. I know this sounds strange, but I feel we have a responsibility to the future owners of the set to keep it as genuine as possible, and at least keep the original components.

That being said, I was delighted when the receiver worked first time which no tweaking at all, and I have to attribute this to the use of American components everywhere, as these seem to survive much better than British components of the same era. This was also experienced when restoring the British WS18 and its



DOMINION RADIO AND ELECTRICAL CORP LTD AUCKLAND NZ.

IF = 455 K.C.  
 CIRCUIT DIAGRAM  
 FIELD WIRELESS SET  
 ZC8 MARK I

NOTE  
 SEND - OFF - RECEIVE  
 Pos 3 - Pos 2 - Pos 1

Fig 5

MODEL ZC8 MARK I  
 APPROVED  
 1933

continued on page 8

Circuit diagram of ZC8, almost identical to the Australian WS108. Diagram courtesy of Peter McQuarrie.



*Topside of chassis, showing two VFO shields for RX and TX. The temporary BNC and trimmer, connected to the central aerial spigot, was fitted for transmitter testing.*

American brother the WS48, and is plainly indicative of the production hardships experienced in Britain at that time. I measured <math>2\mu\text{V}</math> PD sensitivity for 10dB SNR using the aerial coupling of 50pF as per the user manual.

The auto bias resistors R17/R18 were slightly high so I shunted them with new resistors to the correct values.

### Transmitter

This section caused me the most head-scratching. The output power was initially only 50mW, whereas I was expecting 200mW based on the WS108 spec. I had no spare valves, but swapping the oscillator and PA valves showed no improvement, so I assumed the valves were OK. A few capacitors were replaced with new types (leaving the old ones hanging by one leg, for the next generation), and I heated the PA tank to get rid of most of the moisture laden wax, but still no improvement in output. Eventually by tweaking the antenna coupling capacitance to the external power meter I managed to see 100mW, so that would have to do for now. At some stage I will need to look at this again, maybe replace valves, check for RF loss in



*Battery compartment with the microphone, covered with Goo, as received*

the insulators, or look at the drive level from the oscillator.

### String problems

Unusually for a military set, the transmit and receive tuning uses dial cord for its slow motion drives; with the receiver having a locally made die cast wheel. Maybe it is inaccurate, or the shaft groove is the wrong shape, but on this set the dial cord does not run easily, sometimes overlapping itself or jamming at either end. I noticed the wheel was not aligned with the shaft groove, so I filed and refitted the drive wheel, but it showed little improvement. This will have to wait for further inspiration.

### Headphones and Microphone

The headphones were missing, but my colleague Ross Jowitt, notified me of a suitable pair on an online auction. These were Brandes high impedance domestic phones which were used in this set, and I was lucky to win the auction.

As described above, microphone was rescued from the goo but the two core cloth covered cable needed to be replaced. After a long search, and requests to all my colleagues, I found the ideal cable in my junk box! As in many army sets the carbon microphone capsule was red, but I have been told by GPO engineers that red capsules were for high voltage systems, so that remains a mystery to me.

The jack sockets had been locally made, hewn from some fibre rod, with sprung buttons for contacts, and up to now they have proved reliable. One sad discrepancy was the hole size for the boss of its No 9 headphone plug was not drilled large enough, so I had to rectify that. This set was starting to get better than new!

### Batteries

The operator's manual specifies the batteries as two 45V Eveready type 762 in series, and one 1.5V type C116. Particulars for the former are readily available, but the C116 has defied all my attempts to trace its details, and I wonder if it is a misprint. By scaling a photo of the WS108 batteries, I concluded the LT battery is very similar to Eveready type 742(2), or maybe AllDry4. The other strange evidence is the lack of plugs on the ends of the original battery leads, making me wonder if the original batteries were fitted with fahnestock clips. Just imagine having to change batteries in a field of mud, with it raining, blowing a gale, and someone shooting at you! It must be even worse than the WS18 set battery change. The manual mentions a battery connection diagram on the battery door, but this set had no sign of the diagram remaining.

Compared to the normal army sets, the big difference with this is the type of supply used, being domestic Eveready batteries. I normally fit inverter/switch mode supplies in my sets, but as this radio used three separate batteries I chose the good old Zinc Carbon solution for once. Never having made "faux" batteries before, I thought this would be an interesting exercise to try. The box structures were made of 3mm thick MDF, glued together and were fitted with five 9V batteries to give 45V for HT, and the LT had a D cell installed. The only image I could find of Eveready 762 and 742 batteries were very poor photographs (1), so I took these into Corel Draw and redrew the patterns, matching the fonts as best I could. Despite the final result being quite acceptable, I realised eventually it was a little futile as the batteries are tucked away in the bottom of the cabinet, never to be seen. As the photos of these batteries showed socket connections (the 742 has a fahnestock connection) (the 742 has a fahnestock connection) (the 742 has a fahnestock connection) I chose to fit plugs to the ZC8 and will puzzle over the "missing battery plugs" ambiguity in the future.

### Final testing

Once the bench tests were complete, the next step naturally is a field test, and what better set could I chose for the other end of the link

than a ZC1 MK2. As the aerial for this ZC8 was missing, I made up a substitute using four "B" section rods and a couple of 13" brass tubes to bring the size up to the 8.5mm diameter of the base spigot.

We setup a short range test, but this showed up another fault in the ZC8; when the signal was very strong the receiver became unstable. This also explained another fault I had chosen to ignore – the netting function caused all kinds of whistles and squeaks in the receiver.

Back on the work bench, I discovered the decoupling cap on the auto bias was low capacitance, but changing that only partly cured the problem. It was also improved by adding 10k across the AF transformer primary. Running off a bench supply was now OK, but from my batteries the instability was still apparent. I eventually cured it by adding an extra 50uF electrolytic across the HT rail, a requirement probably caused by the high internal resistance of my fake batteries. I did think about fitting the capacitors inside the battery cases, but could not bring myself to add decoupling so far from the load!

Now I could inject signals up to 500mV with no instability. Back out in the test range (garden) I had a fine business QSO with my son on his ZC1, and I wondered how long had it been since a ZC8 had worked with a ZC1?

### Conclusions (so far)

I still feel there is more work to do on this set, the receiver dial cord issues are not sorted, and the transmitter output remains poor. Despite this, the set is now operating reliably, and will be taken further afield for some "DX" working, maybe up to a few hundred metres! I may also have a go at making a harness as per the original leather straps and belt.

In New Zealand we characterise our practical abilities, and local fabrication with the term "number eight wire", meaning we can make or fix anything with fencing wire; by chance the ZC8 wire-less has the perfect number!

βi

### References

- [1] <<https://tinyurl.com/qphfyj7>>
- [2] <<https://tinyurl.com/vwv15uo>>
- [3] Battery Pictures <<https://tinyurl.com/t769uuv>>

# ZL3AC VHF Field Day Contest 7/8 December 2019

By Rick Jackson ZL3RIK <z3rik@gmail.com>

In early 2019 Christchurch Amateur Radio Club decided to make a concerted effort towards an entry for the VHF/UHF Field Day. With the gift of the port hills on our doorstep, a site overlooking the sea towards the North Island was deemed to be perfect.

After first meeting at the Branch 05 Clubrooms to pick up the AREC vehicle, 2:00 pm saw us at the woolshed near Sumner Ridge which was to be our operating site courtesy of the Christchurch City Council for the next twenty four hours. After choosing our exact spot to operate from, assembling and setting up the antennas occupied a good remainder of the afternoon and we were thankful for the help of other branch members for their assistance in doing so.

Naturally not everything goes to plan. Firstly one of our operators was unable to help due to an injury the day before and we had to go to Plan B, or was it Plan C to drive the AREC vehicle.

Secondly it does help to have a power supply to run the rig we were going to use which necessitated a quick trip back down to the clubrooms to get it. Nobody was at fault so we happily blamed each other for forgetting it. Luckily one of the operators had a battery power supply which served us well on a temporary basis till the 240 Volt one arrived about fifteen minutes after the 5:00 pm start time!

Things swiftly swung into action as the contacts started coming in albeit slowly at first and each person took their turn at both operating and logging when needed. Someone was always at hand to swing the antennas around to which ever direction was

needed as the contest progressed.

Operating came to a quick halt at about 9:00 pm when strong winds suddenly developed and we had stop transmitting for twenty minutes. We then went to Plan D which involved slightly altering the operator's location. It then went smoothly from then on till closing time at 11:00 pm and whilst three of us went home, two stayed on site overnight for security.

At 7:00 am the next day we were back into action and of course by this time the logging flowed smoothly as we were using computer logging which automatically entered in the grid squares so we only had to be aware to enter grid squares of any new contacts. We'd decided that to give local handheld operators a chance to contact us as well. So we used the 2 metre FM SOTA calling frequency of 146.500 MHz. This certainly helped get others involved but we did check to make sure that there were no activations were planned.

At about mid-day 6 metres opened up to VK which added to our score but unfortunately the wind was getting up again so in the interests of safety we closed the station down early and forwent even more extra points to our tally.

A special thanks must go to Murray ZL3MH, for the use of his Yagi antennas for 6 and 2 metres and to Alan ZL3UYJ, for bringing his Yagi system for 2 metres and 70



Alan ZL3UYJ and Rick ZL3RIK on the air.

cms. Murray not only supplied his antenna system, but with our help he also erected them. When finished with the Field Day station he then continued on home to compete as a home station.

The following antenna equipment used: 6 m 4 element Yagi, 2 m 8 element Yagi, 70 cm 10 element Yagi.

For the transceiver, a Yaesu FT-897 on medium power.

The team worked a total of 112 stations, and the operators were Alan ZL3UYJ, Bruce ZL3TDF, Andy ZL3KKW, Wayne ZL2AYB and Rick ZL3RIK.

73's Rick Jackson ZL3RIK

## Local Government Liaison Officer (LGLO)

NZART is looking for a person(s) to take up the role of Local Government Liaison Officer (LGLO) from Douglas Birt ZL1BFS. Douglas has signalled his intention to retire from the position at the AGM in Greymouth in 2020.

The job description is here: <<http://www.nzart.org.nz/council/jobs/local-government/>>

### Description of Position

1. The Local Government Liaison Officer is an Officer appointed by NZART Council to retain a reference file of previous cases reported and to supply specialist advice for Radio Amateurs dealing with Local Government.
2. The Local Government Liaison Officer reports to NZART Council.

### Duties of the Position

1. Coordination of information of submissions made to Local Government concerning masts, towers, town plans and other matters relating to the operation of an Amateur Radio station.
2. Supply information and advice to Members and NZART Council as support and assistance in submissions to Local Government.
3. Maintain a reference file of skilled and informed people able to assist Amateur Radio Operators in their dealings with Local Government
4. Provide a contact point for Members and NZART Branches on matters relating to Local Government policies and plans.
5. Competently manage any budget or money approved by NZART Council.
6. Report quarterly to Council plus a written annual report by the 20th January each year. The annual report should also be submitted to *Break-In* in time for the issue that contains Officers Reports for the Annual General Meeting of NZART.

If you wish to apply please register your interest with a short resume for this position by responding to Debby Morgan ZL2DL, by email to <[nzart@nzart.org.nz](mailto:nzart@nzart.org.nz)>.



Murray ZL3MH and Alan ZL3UYJ assembling the 6 m Yagi.

# ZL and the art of Direct Sampling

By Bruce Moore ZL2BMS <bruce\_moore2014@xtra.co.nz>

This article is an attempt to estimate the noise figure (NF) of the RTL2832 as used in the direct sampling mode, [1, 2].

To obtain an insight into the internals of a typical Analog to Digital Converter (ADC) we can stand on the shoulders of the giants of the ADC makers such as Analog Devices (AD), [3], and Texas Instruments (ti), [4]. Looking at the block diagrams in the data sheets of the AD9625 and AD9680 of AD and the ADC12DJ3200 ADC12J1600 ADC12J2700 of ti one can begin to imagine the probable internal architecture of the RTL2832 and its analogue input drive requirements. Perhaps a differential input buffer stage driving a differential ADC. The output data from the ADC is fed to a number of digital down converters (DDC). The DDC, [5], in essence is a digital implementation of the binaural direct conversion receiver as seen in recent ARRL publications. This had two mixers and a VFO and associated phasing plus dual audio lowpass filter output channels.

To utilise the direct sampling mode, one needs to estimate the noise figure (NF) of the ADC. Fortunately, ADC makers such as AD and ti have published application notes, technical articles, mini tutorials and e-books about calculating the NF of an ADC and about driving the input stage of an ADC. Differential input drive is recommended so as to reduce the effects of the internal digital noise of the ADC from disturbing the analogue input signal. Most of the application notes suggest the use of differential transformer drive and some suggest the use of a so called ADC driver IC.

To calculate the NF of the ADC one needs to find the full scale ADC input voltage, the SNR of the ADC, and the sampling rate of the ADC from the data sheet. (The theoretical SNR can be calculated if the measured value is unknown.)

The NF formula given by both ADC makers is:

$$NF = PFS - SNR + 174 - (10 \cdot \log_{10}(fs/2)) \text{ [dB]}$$

Where NF = noise figure in dB, PFS = full scale input power in dBm derived from the full scale ADC input voltage and the impedance seen at the ADC inputs, SNR = signal to noise ratio in dB and fs = the sampling rate of the ADC in Hertz.

Applying the above formula to the data sheet parameters of (e.g.) the TI ADC12DJ3200 gave results that were in reasonably good agreement to the measured values published in the data sheet.

As transformer input drive is typically used the full scale input voltage of the ADC is referred to the 50 Ohm input side of the transformer by taking account of the turns ratio. (The turns ratio is the square root of the impedance ratio.) From this the full scale input power in dBm can be calculated.

The full scale input voltage of the RTL2832 is assumed to be nominally 1 Volt peak to peak differential and its input impedance is assumed to be nominally 3.3K Ohms, [2]. Usually a load resistor is also connected across the secondary of the transformer to provide a defined impedance.

A 1:4(CT) turns ratio transformer requires an additional 1K load resistor to approximate 800 Ohms. Thus, the input referred full scale input voltage is 0.25 V peak giving an input power of:

$$PFS = 0.625 \text{ mW} = -2.04 \text{ dBm}$$

The SNR can be obtained from the data sheets or a theoretical value can be calculated from:

$$SNR = 6.02 \cdot N + 1.76 \text{ [dB]}$$

Where N is the number of bits of the ADC.

The actual RTL2832 data sheet SNR is unknown, however as it is assumed to be an 8 bit device the theoretical SNR is thus 49.92 dB. The actual measured SNR is probably lower than this.

The sampling rate depends on the application, typical values are used in the data sheets to produce the measured results shown by the makers.

The RTL2832 sample rate is assumed to be 28.8 MHz.

The ADC noise figure is thus calculated as:

$$NF = -2.04 - 49.92 + 174 - 71.58 \\ = 50.4 \text{ [dB]}$$

While this NF may seem large it is in the general region of NF values published by AD and ti for their much faster sample rate and wider bit width ADC products such as the AD9680 and the ADC12DJ3200 type products.

The noise figure could be lower than this if the device has some type of internal AGC such as changing the gain of the analogue front end buffer in a few discrete steps or digital gain adjustment of the DSP filters.

This noise figure calculated above is that of the ADC itself which in the RTL2832 sends digital data to its internal DDC. The DSP of the DDC reduces the bandwidth and the output data rate and the data is then sent via the USB to the downstream app. The DSP of the app further reduces the bandwidth and the data rate. The combined DSP filtering of the quantisation noise of the ADC by the DDC and the app improves the apparent SNR by the so called process gain.

The process gain formula given by both ADC makers is:

$$DSPG = 10 \cdot \log_{10}(fs/(2 \cdot bw)) \text{ [dB]}$$

Where DSPG = processing gain in dB, fs = sampling rate and bw = bandwidth filtered from the main spectrum.

The improvement to the SNR by the combined process gain of the DDC and the app is calculated by adding their individual process gains expressed in dB. Each of the process gains from the DDC and the app is calculated via applying the process gain formula shown above.

Assuming the usual Nyquist sampling, the output bandwidth of the DDC is equal to half of the output sample rate, fout. Thus, the process gain of the DDC is theoretically approximated as:

$$DSPG_{DDC} = 10 \cdot \log_{10}(fs/fout) \text{ [dB]}$$

Where fs = input sample rate to the DDC and fout = output sample rate from the DDC.

Assuming fs = 28.8 MHz and fout = 2.56 MHz, this results in a theoretical process gain of 10.5 dB which is equivalent to about 2 bits. (A DDC usually increases the output bit width by a few bits, e.g. see the data sheets of the AD9625 and AD9680.)

However, as the input bit width from the RTL2832 ADC is 8 bits and the output bit width from the DDC is truncated to 8 bits, there is therefore no margin for improvement of the SNR provided by the DDC, thus it is concluded that DSPG<sub>DDC</sub> = 0.0 dB.

The process gain of the app, DSPG<sub>App</sub>, is calculated by assuming that fs = fout = 2.56 MHz and that the app bandwidth is set to 3 kHz, which gives DSPG<sub>App</sub> = 26.30 dB.

Thus, the noise figure of the combined RTL2832 and app is calculated as:

$$NF = 50.4 - 26.3 = 24.1 \text{ [dB]}$$

The NF of 24 dB is comparatively large and a direct sampling device such as this would be perceived as rather deaf compared to conventional equipment. As an example, the FT101 was quoted as 0.3 microVolts input signal to produce a signal to noise of 10 dB in a nominal 3 kHz bandwidth which is equivalent to a NF of about 12 dB.

The use of further filters in the app (e.g. 500 Hz) to also narrow the bandwidth would improve the above results.

The calculated noise figure shown is a theoretical estimate based on the reasonable parameters known of the device. It gives a ball park estimate that is perhaps within +/- 6 dB of reality. As such it enables a designer to figure the front end gain distribution required and the required selectivity.

To configure this device for HF, use with a system NF closer to say 10 dB would require it to be preceded by a tunable preselector of perhaps 30 dB of adjustable gain - some designs of this type were published in EA and ETI.

▣ continued on page 11

# The Find

By Mike Doig <mikedoig72@gmail.com>

George was a collector of telegraph keys. In the first few years he collected all kinds of keys, spending no more than a few dollars on each one, and often picking them up free of charge, from folk who had no idea of what they were and were pleased to get them out of the house. Keys, after all, often look ugly to the layperson and serve no useful purpose. They are hard to keep clean, too.

After a while George became more knowledgeable and realised he would have to specialise. He had some nice early Vibroplex bugs, so he decided to limit his collection to pre-1925 Vibroplexes. This still gave him plenty of scope, because Vibroplex had made thousands of bugs in the twenty years up to 1925, in many different models. George liked to trade items from his collection, he liked to research the history of each key, and he liked to swap notes with other collectors. He became quite an expert, and well-known among his fellow collectors as a friendly and fair key trader.

George's wife was called Milly. She was an accomplished artist and spent happy hours in her studio, which had been specially built above the garage. She thought George's key-collecting hobby was weird, but she encouraged him because it was harmless, not too expensive, and kept George at home most of the time, where she could keep an eye on him.

Milly's mother was French, and Milly was fluent in the language. Every few years she and George would take a trip to France and travel around enjoying the wine and the food, and visiting museums and galleries.

This year they had come to Avignon, where there was plenty to interest them. On Sunday mornings there was a flea market in the public gardens. George was a sucker for flea markets, forever in the hope that he would find a telegraph key which he

could buy for peanuts.

This flea market didn't look too promising. There were stalls selling CDs, old rusty tools, magazines, and cheap ornaments. One fellow had an assortment of used taps, pipes, bath plugs and other plumbing items. George wondered how he could make a living.

Another seller specialised in bags, old leather suitcases, ratty-looking handbags and other luggage. He didn't have a stall, and his wares were simply laid out on the ground. Some had grubby labels advising their prices - usually a few Euros.

Among this unappetising merchandise George noticed a small leather box, battered and inkstained, but nicely made. The box was about the size of a house brick, and its lid was at one end rather than on the top. George picked it up. It was heavy. He opened the lid and looked inside. He gently closed the lid and put the box back amongst the other junk.

He gestured to Milly and took her aside.

"You won't believe it, but somehow this old fellow has got hold of a Vibroplex Vertical. It's like the Holy Grail to us collectors. There are very few in existence, and most of them are in museums. Can you ask him what he wants for it? Very best price. Don't let him suspect I know it's very valuable."

Milly looked pityingly at George but engaged the luggage seller in conversation. She pointed at the leather box. The old man looked disdainfully at the box, wrinkled

continued from page 10

## References

- [1] <www.rtl-sdr.com>
- [2] <www.g8jnj.net>
- [3] <www.analog.com>
- [4] <www.ti.com>
- [5] <www.wikipedia.org>

The NF formula given by both ADC makers is:  
NF= PFS-SNR+174-10\*log10(fs/2) [dB]

# New Members



Name	City/Town	Branch	Call-sign
D McNeill	Papakura	10	ZL1DW
E S Rose	Auckland	3	ZL1EK
S R Hayman	Orewa	66	ZL1TPH
I J Wards	Hawera	87	ZL2AHA
A E Riemsdijk	Hawera	27	ZL2AVR
T Shi	Christchurch	5	ZL2BO
I F Cooper	New Plymouth	27	ZL2NP
O R Riemsdijk	Hawera	27	ZL2OVR
D Nitschke	Hastings	30	ZL2XO
S Wilson	Auckland	99	ZL3IUB
M Atherton	Christchurch	5	ZL3JVX
R M Bishop	Christchurch	5	ZL3KPM
G N Sutcliffe	Tauranga	88	ZL4GS
A J Melgren	Invercargill	37	ZL4TKJ
W R Bishop	Christchurch	5	ZL4XS

## Is your local District Plan under review?

Doug ZL1BFS <lglb@nzart.org.nz>

NZART's Local Government Liaison Officer is available for assistance and advice.

Don't be caught out when your local District Councils' District Plan is up for review, keep Doug in the loop!

## REMEMBER:

Leave a three second pause between overs when using repeaters.

Someone else may have an urgent message.

his nose, looked at the sky, blew out his cheeks, scratched his chin and pursed his lips. He looked at George, who was struggling to look uninterested. He said something to

Milly in a low voice.

Milly came back to report.

"He says, very, very, best price, no haggling, for cash - eleven thousand Euros."

The theoretical SNR can be calculated from:

$$SNR = 6.02*N + 1.76 \text{ [dB]}$$

The ADC noise figure is thus calculated as:

$$NF = -2.04 - 49.92 + 174 - 71.58 = 50.4 \text{ [dB]}$$

The process gain formula given by both ADC makers is:

$$DSPG = 10*\log_{10}(fs/(2*bandwidth)) \text{ [dB]}$$

# The First ZL to VK Contacts on 10 GHz at 2040 Kilometres

By Roger Corbett ZL3RC

After watching the Hepburn Map develop a very strong pattern between northern NSW (New South Wales) and the West Coast of the South Island Rex VK7MO and myself set off to try and prove that ducts formed by these weather conductions don't have an upper frequency limit. They do display a lower limit based on the height of the duct but nowhere was there any documented information about the maximum frequency they would support.

Rex from Tasmania had already based himself at his sons' home in Melbourne from late December 2019 but he still had to travel for maybe up to two and a half days to reach a useful site. I on the other hand only had a three-hour trip to the West Coast. So, the plan was for Rex to travel north up to the Victoria and NSW Coast to a favorable site when the Hepburn Map was predicting favorable conditions.

The probability for a useful duct sometime in the late December 2019/January 2020 were good but I think we were surprised to see such an intensive duct forming so early in our available time frame. In fact, it was looking like we may have to start moving on Boxing Day but as these things have a habit of doing, it moved more towards New Year.

As the days went on the Hepburn Map started to look good on 29 December. It then looked very good on the 30 December – well heck this is looking incredibly good on the 31 December so we had to start planning Phase Two of this attempt.

Rex had done some homework and along with Glen VK1XX they

found a good site at about 430 metres ASL. I had a site, which we had used before, just north of Nine Mile River about fifteen kilometres north of Greymouth in RE57pq. It has easy access but it was a public viewing area and this caused a different problem, but more on that later.

You have to remember here that these Hepburn Maps are only predictions and these can change dramatically so fingers crossed. So, Rex set off for Canberra to stay with Glen and then off to the site the next day. Problem was with the bush fires around the area, operating from any type of reserve or public area was going to be difficult and even more so while running a petrol generator!

But as it happened the Radiosonde Data from Newcastle was showing the duct was forming at quite a low level around 377 metres ASL while the site that Rex and Glenn had their eye on was well over 400 metres ASL. This meant the site was too high anyway so it was decided to head further north to clear the bush fires and find a better site. With the help of Grant VK2MAX and driving a greater distance, a more



Figure 2 – The ZL3RC to VK7MO Path.

suitable site was found at Crescent Head at 72 metres ASL in northern NSW in QF68lt.

Back here I had the luxury of waiting for all this to happen and it was decided I would leave home on the morning of the 30 December 2019 to arrive at my site around 9:00 am which meant leaving home at around 5:30 am.

I arrived at the site and setup, running a bit late as normal, and we soon had good S8-9 2 m signal reports exchanged. This confirmed that the duct was working at that frequency so we moved up to 70 cm where we exchanged a lesser report but still good signals at around S5-6.

On moving up to 23 cm, using my GPS locked Transverter, we discovered a frequency instability problem that stopped us making any contact. This instability was to return in a much more dramatic way on the second day of activity.

Signals were a bit weaker than what Mr. Hepburn seemed to be suggesting by his map but at least we were able to exchange reports on our two bands and complete an easy QRA64 contact on 70 cm.

I hadn't setup 10 GHz at this stage having been late arriving but we decided to give it a go. I think at this stage I had not held much hope of a signal on 10 GHz but what the heck we had to try.

Normal practice is to send a 1000 Hz tone via QRA64D and once that is received we could evaluate its

strength and then maybe move on to sending a message.

One other very important bit of information was needed here and that was where to point. The 1.13 metre dish which I was using has a beam width of 0.7 degree at 10 GHz so I had to be pointing better than that in Rex's direction for this to work. Google earth is your friend here and luckily to the south of me at about ten to fifteen metres was a very pointed and easily spotted rock. It turned out to be at 215.5 deg so that became my azimuth reference. Rex was at 301 degrees so the dish was cranked around to that heading and I started sending 1000 Hz tone.

Blimey, what's this a big fat red line red at 1000 Hz on the waterfall display of WSJT? Man alive that's Rex. After a couple of 1000 Hz tone TX periods his tone moved to 1250 Hz so I knew he was receiving me and I moved to sending the "VK7MO ZL3RC RE66" (RE66 is not the correct Grid. That's my home grid).

We soon exchanged -17 reports via QRA64D so there it was a 2040 kilometre 10 GHz contact WOW!

I then got a free text message from Rex in QRA64 of "TRY SSB" so I quickly changed to SSB. I could hear Rex calling, not strong but it sure was him. I went back giving him a 3 x 1 report and waited fingers crossed he would get that. He did and replied with a 3 x 1 back to me with call-signs clearly heard.

Wow, had we just done that, yes

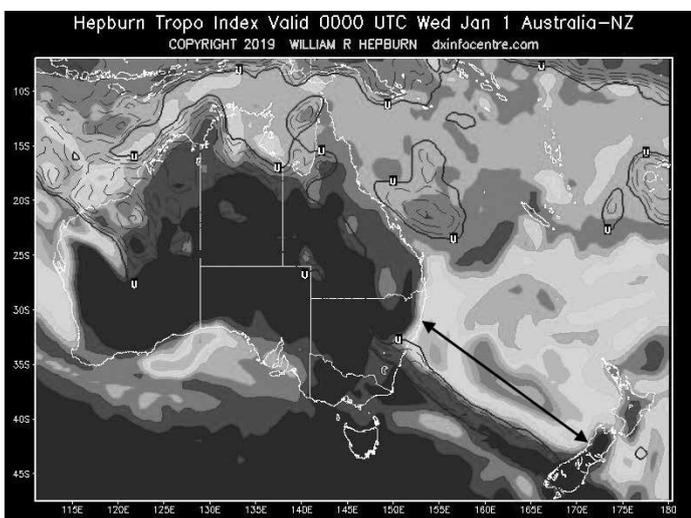


Figure 1 – The Hepburn Map Predictions – A Great Path.

we had. Two contacts across the Tasman on 10 GHz, firstly on digital modes and then on SSB.

I packed up and drove to a friend's place at Charleston (Pete ZL3TJH) about forty five mins drive up the coast and spent the night with him to return to the previous days site in the morning.

Checking the Hepburn Map the morning of the 31 December 2019 it was still looking good so I drove back down the coast and setup. We again started on 70 cm and signals were down from the first day but still there so on up to 10 GHz we went. It was at this time that Mr Murphy's law stepped in and things started to turn to custard. After a bit of confusion, I started seeing Rex's 10 GHz signal as a series of dots across the waterfall display. It was moving at about 2 kHz a minute and it looked to be moving at the same rate and in the same direction across a couple of periods. It looked very much like I had Doppler correction in WSJT turned on, no it was off. Maybe Rex has his turned on, no was the reply so the problem solving started. A quick check by Rex with his field low power reference and it was stable so the problem was at my end, damn!

After trying everything I could, the problem persisted so I suggested we abandon the days operation and I would drive back home to Christchurch and either fix or get my second GPSDO. It was a bit of a gamble but what else could I do and because the Hepburn had been looking so good for the last two to three days, so I was pretty confident it would continue. I headed off on the three hour drive home at about 2:30 pm arriving back home around 6:30 pm New Years Eve.

Setting up the gear back at home it all worked as normal, damn it! I wasn't at all surprised as I'm sure

we've all been here and done that. So, the only thing to do was take the second GPSDO back and use that with the hope that this was the problem.

I made the decision to leave the trailer at home and only take 70 cm and the 10 GHz gear back over early on New Year's Day leaving home at 5:30 am.

I checked in with Rex at 7:00 am as this is when the Hepburn Maps are updated each day. At this stage I was at Arthur's Pass, and the updated Hepburn for the 1 January 2020 local time was looking very good and much better than the previous day.

I arrived back on site around 10:30 am and soon had 10 GHz and 70 cm set up. Calling Rex on 432.2 MHz returned a huge S8-9 SSB signal so things were much better than the days before. We then moved over to 10 GHz and straight away Rex's 1000 Hz tone (now very stable under the control of my second GPSDO) was much stronger and the contact that followed was at -10 to -11 probably stronger than that in real terms as QRA64 gets swamped at around -10 I'm told. Again, moving to SSB after completing the QRA64 contact and what a signal. I could tell the tones in the digital signal were stronger but Rex was sitting at a good 5 S points above the noise on SSB and most of the time was pushing the S meter into the red above S9!

We chatted for some time and I also worked VK2MAX and VK2GTS who were of course using Rex's gear. We then spent some time gathering recordings of 1000 Hz tones at both 70 cm and 10GHz so we could make some relative signal strength readings and also analyse the tones. At around 3:00 pm I packed up again and once again headed home this time with a big smile on my face.

I mentioned the site I used was a



Figure 4 – ZL3RC's Site Setup.

public viewing area and as a result I had a lot of visitors all wondering what I was up to. I guess as you can see from the pictures taken of the setup I would probably have done the same. It was just that as a one-man band I had a lot going on and standing talking to large numbers of tourists, took its toll on my time. Rex had a similar problem at his end too but he had a PR person in the form of VK2MAX which helped.

I joked to my wife Liz that I should have made a hand out to save time and others have suggested white overalls and one of those Non-Ionizing Radiation Risk signs may have helped.

What do you tell them? Some of the opening comments were quite interesting from "Are you taking pictures" to "are you spying on boats at sea". I soon made up a good layman's description of what I was up to and most were very interested, asked good questions so I hope I did my bit to promote our hobby.

So, what did we use and what have we learned from these contacts. Here are a few things that have been observed:

After allowing for differences in system performance (including absorption) propagation loss in the duct at 10 GHz varied from 5 dB stronger than calculated to 10 dB weaker suggesting that there is no significant loss in the duct with

frequency.

Test showed that elevation gave strong signals from around +2 degrees to -2 degrees somewhat larger than the antenna beam widths suggesting that one can enter the duct over a range of elevation angles or by reflection from the sea.

Test showed no skewing or azimuth spreading of the signal direction with the azimuth signal levels dropping in accordance with antenna beam widths.

There was very rapid QSB of up to 20 dB on 10 GHz on a time scale of a few seconds compared to around a minute or more on 432 MHz suggesting as expected that QSB rates reduce in proportion to frequency.

10 GHz showed significant spreading of up to 15 Hz compared to about 2 Hz at 432 MHz (432 MHz may be less than 2 Hz where drift of a non GPSDO locked IF radio may dominate).

What did we use? On 10 GHz I used a Yaesu FT-991 to a DB6NT transverter followed by a 60 W amp to a tripod mounted 1.13 metre prime focus dish. On the RX side a DB6NT preamp with 0.7dB noise figure rounded out the system. 70 cm it was just the FT-991 with its 50 W to a 13 element DK7ZB Yagi.

Rex was using the same 10 GHz setup and power except he was running a smaller dish at 0.76 metres and he used an ICOM IC-9700 as the IF radio. At 70 cm Rex used the IC-9700 at 70% power to match my setup and was using a 12 element Yagi.

If you'd like to listen to the two days signals I have posted them up on YouTube at:

Day 1 – 30 December 2019 <<https://youtu.be/cOYxuZ5YjZl>>

Day 2 – 1 January 2020 <<https://youtu.be/QrgxiKxs4ek>>

Or just search in YouTube for ZL-VK 10 GHz. β

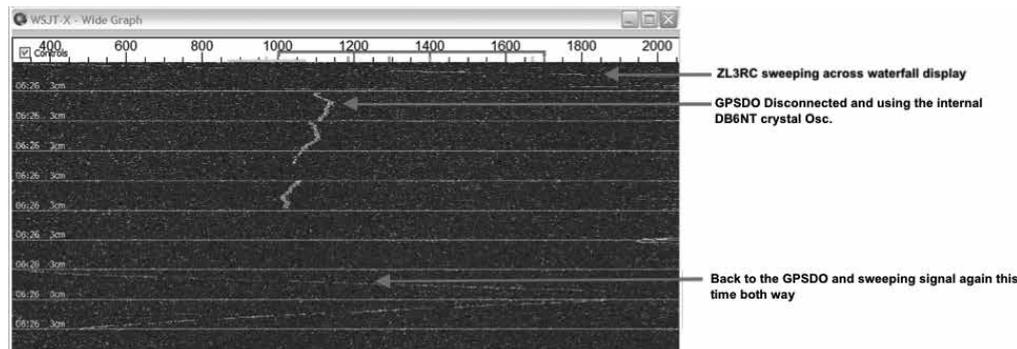


Figure 3 – The Unstable 10 GHz Signal With the Dodgy GPSDO.

# The State of 6 m in ZL in July 1997

By Bob McQuarrie ZL3TY <b\_mcquarrie@minidata.co.nz>

The following article was written by Bob McQuarrie ZL3TY in 1997 explaining the state of the 6 metre band in New Zealand as it was. As Bob has recommended that his role of 6 Metre Liaison Officer be disestablished, the article below is re-printed from the UK 6 Metre Group's web page <<http://www.uksmg.org>>.

Also included is the original Break-In article from December 1994 establishing the role of 6 Metre Liaison Officer. NZART Council past and present express their thanks to Bob for his twenty five years of service in this position. This role has been disestablished as of 31 December 2019 (Editor).

Recent postings on this subject have brought to light the worsening situation here in ZL for amateurs wanting access to the 50-51 MHz part of the 6 m band. Broadcasters are still turning on new transmitters and even those of us left with access to 50 MHz are at risk. I have recently won a local battle with one of the networks who were planning the installation of a transmitter in my town, a distance of about 3 kilometres from my QTH. Fortunately, I was able to convince them to use a different VHF frequency. Chris Gare suggests that

we need to be proactive and fight it - like they did in the UK. I wish it was that easy.

In Europe the opening of 6 m to amateurs has occurred because broadcasters are abandoning Band 1. Here in ZL they are actively trying to fit more transmitters into Band 1. Believe it or not!! DTH satellite broadcasting and cable are in their infancy with the majority of TV services being from terrestrial transmitters. We hope that the introduction of digital TV in the next decade or so might result in abandonment of Band 1. It seems

that tests have proven the error rate to be excessive for acceptable received pictures.

Yes, in the ITU regulations for Region 3 the spectrum 50 to 54 MHz is allocated on a PRIMARY basis to amateur radio. The footnotes allow the alternative broadcast use. The New Zealand Administration has been proactive in seeking to eliminate footnotes but, of course, it sees its own footnotes in a different light from others.

The New Zealand (and VK) Administrations are hiding behind paragraph 342 of the ITU Regulations which states, in effect, that an administration can use any frequency for any station, provided only that harmful interference is not caused to a station (in another country) of the service which has been allocated that frequency. We have suggested to our Administration that they are breaching their international treaty obligations because ZL TV transmitters create harmful interference to overseas amateurs legally using frequencies which they have primary rights to. But unless the government of the countries where the harmful interference occurs is willing to protest to the ZL government nothing happens. The country most likely to have a strong case is Australia and they are hardly likely to protest to NZ when they are using the similar footnotes to enable them to permit TV transmitters in the amateur's primary allocation. Maybe some of you out there can persuade your Administrations to protest to the ZL government about the harmful interference the ZL TV causes during F2 openings.

The ZL situation is that broadcasters have been sold what is called "Management Rights" to the 50-51 MHz chunk of 6 m (along with the rest of the spectrum used for TV broadcast). The original proposals from our Administration suggested that amateurs be totally excluded from this part of the spectrum, however after strong representations from NZART this was modified. The management rights effectively hand control of the affected frequencies to the holder of the rights. To get around

this legalistic problem the Government issued a licence to itself and has entered into individual contracts with hams to allow us to get access to 50-51 MHz. If you are confused by all this, join the club. It is beyond the comprehension of normal sane radio amateurs whose chief concern is to indulge in the relaxing hobby of ham radio. Consequently, a lot of people who may otherwise try 6 m don't bother.

As for taking legal action, this is precisely what the new de-regulated environment wants. The system as set up allows participants to resolve issues through the courts. The problem is who do we act against, the Broadcasters or the Administration, or both? Both of whom have enormous financial backing to pursue their aims compared to what a few amateurs could find. Frankly, I don't need the hassles. Our association NZART has its own problems with the Administration in several other areas and is very unlikely to put a considerable quantity of members funds at risk to fight for what is a fringe activity. Besides, is it worth taking the Administration to court and risking what is currently a reasonable working relationship.

The situation here in ZL could be worse (slightly), we could be totally banned from operation in the 50-51 MHz segment. NZART has a policy of seeking restoration of our primary rights to the full 50-54 MHz band and this is raised at every opportunity with the Administration. However, until the broadcasters decide to turn off their transmitters we have no chance. What we need to prevent is someone finding an alternative commercial use for our band in the meantime. This should be of immediate concern to all VK amateurs.

So, all of you who haven't yet worked ZL, or want to work us again in the future, keep hoping that at least a few of us can maintain the toehold we still have on the band. And spare a thought for the hams who have just been told to cease operating after a lifetime of chasing *DX* on 6.

βi

73 Bob

## NZART Official Broadcast

is on 3.900 MHz USB at 8pm on  
the last Sunday of the month.

It is also available on the  
National System.

Be involved in your organisation.

Attend a branch meeting near you.

See *Call Book* for information.

Next deadline for copy is  
10 March 2020

## Six Metres Policy Statement by NZART Council

At the NZART Council face-to-face meeting in October, a number of issues related to the 6m band were considered. The following new policy has been adopted.:

### Six Metre Policy statement

Recognizing that,

- (a) access to all of the international six metre band is of crucial importance to New Zealand amateurs;
- (b) television channel 1 is likely to be used for some years yet to come, as a historical consequence of New Zealand's footnote access by broadcasters;
- (c) television 1 will likely be cleared for amateur use when a better technical, economic, or political solution becomes available;
- (d) long term access to the six metre band requires new and sustained activity by amateurs;
- (e) the history of amateur use of the international six metre band in New Zealand has seen a confusing variety of policies available for access;

NZART resolves that,

- (a) access to part of the internal six metre band currently available to New Zealand amateurs shall not be lessened by way of trade or negotiation by NZART with the administration in New Zealand;
- (b) improvements in access to the international six metre band, by way of frequency range, geographical limits or times of use, will be vigorously sought by NZART whenever such improvements are possible;
- (c) information on the terms, conditions, rights and obligations of amateurs for access to the international six metre amateur band available in New Zealand will be available to all amateurs and promoted by NZART;

(d) NZART shall promote, publicise and at every opportunity develop those technologies that improve the advancement of existing television channel 1 services to alternate delivery methods and which, as a consequence, free all or part of the international six metre band for amateur use in this country;

(e) an ongoing dialogue with the New Zealand administration, users of television channel 1 services, television funding providers and other international amateur bodies will be maintained, in order that every opportunity for advancement of access to the international six metre band is gained.

The most pressing issue at present is the possibility that TV3 will install television transmitters on channel 1 as part of coverage expansion plans. NZART President Jim Meachen ZL2BHF has written to TV3 expressing opposition to installation of any further transmitters. As a follow-up Council will be attempting to build a long term working relationship with TV3 to try to find mutually beneficial solutions to the problem of television channel 1.

It is now almost two years since the formation of the Six Metre Working Group (SMWG) and for various reasons it has failed to function as was originally intended. At the NZART Council October meeting it was decided to disband the SMWG.

Rather than have a formal group such as the SMWG, Council considers it is better to deal with issues on an "as-needed" basis. The Council, however, is concerned that there should be someone to whom they can refer to for advice on specific 6m issues. It was decided to appoint Bob McQuarrie ZL3TY as Six Metre Information Officer to act as a direct input to NZART Council decisions on 6m.

### Beacons

Good progress is being made on the W6WXB beacon transmitter which will be the standard unit for the International Beacon Project. The unit under test in California transmits for one minute on 14.1 MHz at 10 minute intervals starting at one minute past the hour. It then changes to 21.25 MHz and transmits for 10 seconds before going onto 28.1 MHz. Further tests will be done at KH60B. The seven stations already operating on 14.1 MHz will be equipped first, followed by the new stations in Peru, Venezuela, New Zealand and Sri Lanka. Others located in Western Australia and Kenya are a possibility. All should be ready for the start of the next sunspot cycle in about two years time. To complete the

set of 15, sites are being sought in China and Russia.

An ad hoc Beacon Project Committee has been set up by IARU to study ways in which HF beacons can be better used. Can they contribute to an ITU study group dealing with propagation? David Rankin 9V1RM chairs the committee with Richard Kirby W0LCT Director of the ITU Radiocommunications Bureau; Dr Kevin Hughes G3WOZ, Counsellor, Radiocommunications Bureau, Geneva; Jack Torster W6ISQ International IARU Co-ordinator for the HF Beacon Project; and Martii Laine OH2BH as members. Jack and Martii have long been associated with the North California DX Association Beacon System.

ZL1HV

## Interested in Data Communications?

### MFJ can offer the units below at Best Mate's rates

#### MFJ-1270C \$295.00

*New model. TAPR YNC clone. Now supports 19.2k terminal baud rate. Dual HF/VHF. Has 300 and 1200 baud standard. Has standalone mailbox. KISS interface and MFJ Host Mode standard. Easy conversion to 2400/9600 baud with optional plug-in boards.*

#### MFJ-1276 \$440.00

*FACTOR and Packet all together in one unit. All the features of the MFJ-1270C but has FACTOR as a mode. Has Packet mail box. FACTOR is an exciting new HF mode.*

#### MFJ-1278B \$695.00

*Their best multimode data controller. Standard features include Factor, Packet, Amtor, RTTY, ASCII, CW, Fax, SSTV, Navtex, Contest Keyer. Has stand alone mailbox. Software selectable radio ports. Supports 19.2k terminal rate.*

NO SOFTWARE IS INCLUDED IN ABOVE PRICES. SOLD SEPARATELY. PLEASE ENQUIRE.

**G3RUH compatible 9600 baud modem—\$250 or 2400 baud for \$220**

Send 80c stamp for FREE 1994 MFJ Catalogue

## City Electrical

757 Main Street, Palmerston North  
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# Upgrading the TechnoClub Rover project for schools

By K.P.Barnsdale ZL3KB

A few years ago, I realised there were a dwindling number of mentors around for our young, up-and-coming electronics enthusiasts, so in 2008 I started an after-hours electronics club at a local intermediate school. One of the projects I had created for them was the programmable robot 'Rover', finally getting to version five after a progression of improvements. In 2015 we converted the club into a class called 'Mechatronics' within the school curriculum, and for four years we ran the Rover5 project over each school term. The students built the robot from components and learnt some Basic programming, but unlike similar robotics programs they took the robot home at the end of the term. As it used the Picaxe microcontroller chip, the students could download the free programming software to continue learning with it at home.

## A new design

By 2019 the project had become too expensive, and a major redesign was needed, so the Rover6 upgrade was started. Reducing material costs was a major objective, so the aluminium chassis was replaced with laser cut MDF, which also brought a sustainability message that not everything has to be made of plastic. From the underside photo, you can see the PCB is assessable to both top and bottom sides, a real benefit when fault-finding!

The motor gearbox had risen to more than half the cost of the whole project, so a common type of motor gearbox was obtained from China. I initially chose a high ratio gearbox, but the first types proved to be very weak and stripped the final gear in many cases, so beware the "blue ones"! The lower ratio "yellow types" seem to be very good.

## Changes made

In addition to lower cost, there were a few improvements to the

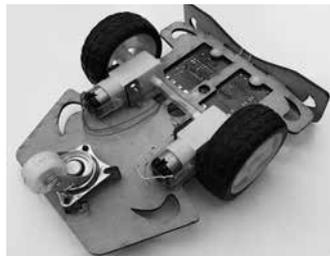


Figure 2. Rover6 Underside.

design needed for Rover6. One major change was adding a full H bridge driver to each motor, to give the ability for reverse and braking. Secondly, the programming cable interface was made easier. The Picaxe microcontroller typically uses a UART serial connection for programming; when a laptop computer with only USB is available, a USB-serial converter cable is needed, and it must be a true FTDI type, not a Chinese copy! The Rover6 design now includes a USB-serial interface module, so a cheap, standard mini USB cable is all that is needed, and it allows the circuit board to be powered by the USB too. Interestingly, it was cheaper

to use the module than to design in a separate USB connector and FTDI chip, but this might change in the future.

## Which processor?

Some suggest I should use the "more popular" Arduino series of microcontrollers, which would certainly bring some cost advantages. However, I feel the free programming software does not have sufficient support for this age group that have never programmed before, especially if they continue it on at home. So, the existing Picaxe device was used again. However, I carried out investigations into its longevity, as it is getting quite long in the tooth now, and was satisfied there are a few years left in it yet.

Considering the future of electronics lies in software, it was decided to reduce the amount of hardware building for the students, to allow more time for programming. Therefore, the PCBs now contain some surface mount components which are preloaded and tested, and this allowed for a choice of more "modern" devices in the design. The students still have to solder in, and check, nine components and wire up the motors and battery.

## The Rover6 electronics

The photo of the PCB shows the main components. Down the centre runs the light sensor collimator, to allow the robot to "follow" light. In the upper left is the dual H bridge motor controller, on the right is the USB adapter module and in the lower centre is the small speaker.

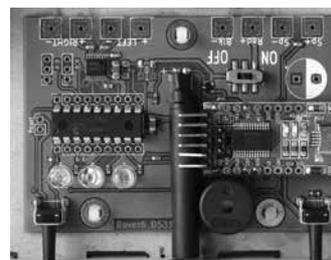


Figure 3. Rover6 PCB.

On each side of the bottom edge are 'bumper' switches which allow the robot to sense collisions. Red, yellow and green LEDs are provided for signaling. The students have an

hour and a half to assemble and solder all the leaded components, and large wiring pads have been provided for them to connect the motor and battery wires.

## Testing

Only the students will be able to tell you what is easy, hard, confusing or impossible, so to shake down any problems the prototype was run as a small class in July 2019. As mentioned earlier, failures of the type of motor gearbox caused it to be swapped, and it was found the school's soldering irons could not cope with a four-layer PCB. Also, some changes were made to resistor values to adjust the sensitivity of the light detector. Since then we have run a successful class with no problems.



Figure 4. The inaugural class of happy victims.

## Finals

We are now gearing up for the 2020 school year, and hoping to offer this project to other technology teachers if they could find it of value. Our own radio club (Branch05 Christchurch) is also intending to revamp its RadioTek program, so this project may be a part of that too.

The materials cost came out to be around \$40, and we get each student to contribute \$15 so we can stretch our funding for as long as possible.

This project could not have come about without generous funding from the NZART Radio Science Trust and Contel Charitable Trust; these funds will help sustain the project for the next year or two. Also, thanks to QuickCircuit Ltd Christchurch and Novatronics Ltd for providing their services virtually free, and to the class teacher Jeremy Brownebrooke for putting up with me.

The information for TechnoClub Rover5 and Rover 6 projects can be found on the Branch 05 website. β

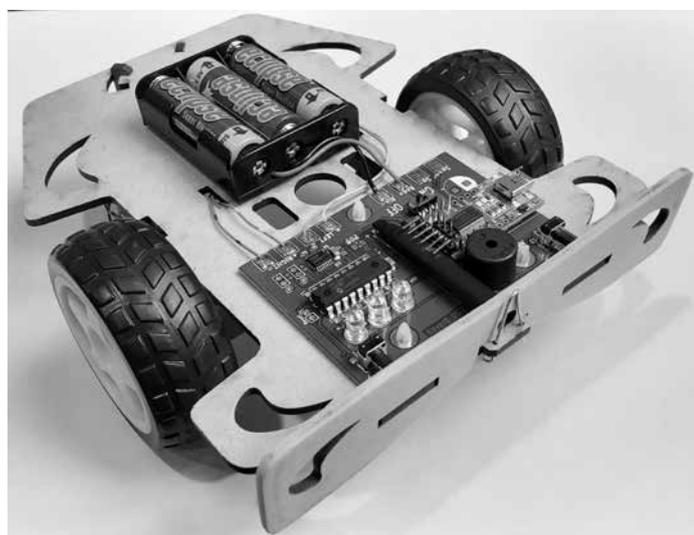


Figure 1. The new Rover6 robot.

# NZART Activation Day 1 January 2020

By Brian Cathcart ZL2CHV

*Greetings and Happy New Year fellow hams.*

In preparation for the NZART Activation Day on 1 January 2020, I advertised on the both the Facebook pages of Upper Hutt Branch 63 and YOTA, that I was opening up the Kaitoke Airstrip (the location of Upper Valley Gliding Club), as the location for this event. The Airstrip is located off State Highway 2, near the entrance to the Remutaka Incline Trail, some ten kilometres north of Upper Hutt. It is easily accessible by any type of vehicle. There is no public transport to this site.

The reason I choose this venue (apart from being a social member of the Gilding Club) is that there is a zero noise floor. I can hear signals that do not even push the S meter at all, and it is a relatively dark sky site for astronomical telescope use, another interest of mine. It also has a nice little spot for camping, see Picture 2.



Picture 1 Facing North-West of the Upper Valley Gliding Club, Kaitoke.

Of course some preparation was required for this site, namely some time spent behind a lawnmower on the morning of Monday 30 December 2019. Having mowed without a catcher then again with a catcher, I was a bit knackered but pleased with the result. The white boxes in the distance are derelict glider trailers and on the right a small diesel roller. See Picture 1 for a new camp site.

The location is a nice quiet spot, well away from any roads, but still close enough to civilisation should you need anything from home, or brought from home having forgotten

to pack it. There is no mains power on site. The pop-top is mine and I had friends staying in the tent. The vertical antenna mounted on the draw bar of the vehicle is via a nine metre pole with six metre antenna on top of that. The antenna tunes from 160 m to 10 m with an auto tuner. From previous visits and usage at this and other sites it does a pretty good job.

The gear I take to play portable radio is an ICOM IC-7100 with an external auto tuner in a Go To Box. Power is supplied by 2 x 100 Ah deep cycle batteries and these get topped up by a 280 Watt permanently mounted solar panel on the roof of camper. From this setup I also run a fourteen litre fridge to keep those all-important drinks cold. I can even run the fridge overnight on reduced power.

So even with all the advertising I

had a few verbal "I'll be there's", but strangely enough no one who said they would be there showed? This was mildly disappointing, many away on holiday I guess? Or many be they got a better offer?

The two people who turned up are always reliable and said they would show. So thank you to Simon ZL2BRG and David ZL2DRM. David didn't operate, just came for a visit. Simon brought up his MFJ magnetic loop mounted on seven metre pole on a trailer. This is an interesting bit of kit that he can write about!

On the morning of 1 January



Picture 2 Camping site after some preparation with the lawnmower!

2020 I was checking the bands before the event started and came across Darren 3D2DJ, working out of an island around Fiji. So that was my first DX for 2020! We had a good QSO. I gave him a signal report of 52 and in reply he gave me a 59, that was on 28.495 MHz.

Once the event started I occupied 7.105 MHz for a while, my first contact was Stuart ZL2TW. Stuart was good to talk to so thanks for the great QSO. I managed to get about fifteen calls, they all seemed mainly to be guys doing SOTA, running 5 – 15 or as high as 100 Watts. So well done to the QRP people. Everyone was well spread around the country, so propagation was working well, north and south.

While I had a break and Simon had a crack at the radio, going all over the bands. He managed to get

a few, but I'm not sure where.

After Simon's go I had another crack. There was not a whole lot going on? Where did everyone go? So I tried some DX'ing instead. As I have mention earlier the Gliding Club is a great place to work from, as it the only place I've had to use PBT (Pass Band Tuning) because it is so quiet.

To top the day off Stuart gave me another call to say cheers, awesome effort.

Roll on Jock White Field Day (22/23 February 2020) as I think Upper Hutt Branch 63 (ZL2VH) is doing it from here again. I may sneak up Friday night before Jock White Field Day to get the best spot, and do some DX'ing prior to the event. Listen for me then as either ZL2CHV or the club call of ZL2VH.  $\beta$

73's Brian ZL2CHV



Picture 3 The air strip looking south.



As announced at the 2019 WIA Annual Conference in Sydney, the 2020 Conference will be held over the weekend of 8-10 May 2020 in Hobart Tasmania. Antarctic Gateway is the theme and so some interesting Antarctic and Radio visits and presentations have been organised over the weekend.

#### **Friday 8 May 2020**

For a lucky thirty people there will be a guided tour of the Australian Antarctic Division (AAD). Friday afternoon will also see the Club Executive's Gathering at the Best Western Conference venue.

#### **Saturday 9 May 2020**

Saturday morning will be the WIA Annual General Meeting and Open Forum held at the Best Western Hotel.

#### **Sunday 10 May 2020**

Opportunity to explore Hobart with these organised tours. Small groups will be bussed to:

- Mawson's Hut Replica Museum
- Tasmanian Maritime Museum or Tasmanian Museum and Art Gallery
- Grote Reber Museum and Radio Telescope Dish

## **Come join us for the WIA Conference 2020**

**See this link for additional details:**

**<<https://www.wia.org.au/joinwia/wia/2020agm/>>**

# Magazine Survey

Compiled by Grahame Fraser ZL3SJ  
<magazinesurvey@nzart.org.nz>



## QST

### December 2019

- p.30 Slot-Cube Antenna for 6 Metres
- p.34 Product Review: Alinco DJ-MD5TGP DMR and Analog FM Handheld Transceiver; Diamond X6000AVHF/UHF Triband Antenna and MX3000N Triplexer; bhi Ltd ParaPro EQ20B-DSP (modular audio power amplifier with digital signal processing and Bluetooth input);WA3RNC 40-Meter CW Transceiver Quick Kit
- p.46 Low Sunspots Mean More Cosmic Rays
- p.51 Terahertz on the cheap (old toys which transmit infrared text data)
- p.57 "On the Air" (the next magazine from ARRL for newer hams)
- p.86 Hurricane Dorian's Tropospheric Opening
- p.94 A Look Back (QST for October 1969)
- p.100 Classic Radio: The Galaxy III and V Transceivers

### January 2020

- p.30 Constructing Metal Enclosures
- p.33 Untangling the Decibel Dilemma
- p.39 Comparing Mobile/Portable Antennas for 20 Metres
- p.42 Product Review: ICOM IC-9700 VHF/UHF Multimode Transceiver; N6BT V-8 Vertical Dipole from 80 – 10 Metres, mAT-Tuner mAT-125E
- p.66 Nashua Area Radio Society Outreach to New Hams
- p.70 ARISS's Next Generation Radio System Progresses Toward Launch
- p.82 Hiram Percy Maxim 150th Birthday Celebrations Results
- p.93 A Look Back: March 1970

### February 2020

- p.30 Build your own D-STAR Hotspot
- p.33 CW Combo Key
- p.39 CAT – Computer Aided Transceiver
- p.43 An SWR-Shifting T
- p.47 Product Review: Flexradio FLEX-6600M HF and 6-metre SDR transceiver; DX Engineering RX Share Audio Switch; Workbench "Third Hand" Circuit Board holders
- p.65 The Evolution of Power
- p.72 Easy Super Stealth Antenna
- p.94 A Look Back (QST for April 1970)

## RadCom

### December 2019

- p.17 Review: bhi NCH ACTIVE noise cancelling headphones
- p.18 Antennas: Wind loading on masts and guys
- p.22 Minimalistic 500W LDMOSFET 2-30MHz RF amplifier
- p.30 Review: RT Systems programmer (programming software for 170 different radios)
- p.32 'FELIX' the Nazi spy and his South African transmitter
- p.39 Data: Why data modes can fail
- p.40 A programmable audio DSP filter (uses Analog Devices ADAU1701)
- p.44 Design Notes: Digital radio basics (part 2)
- p.62 Review: The Ciro-Mazzoni 'baby' Loop
- p.75 Bluetooth handheld headset combo (compatible with Kenwood, Boefeng, and TYT Anytone handhelds but not Motorola, Wouxon or Icom)
- p.76 EMC: LED lamps

### January 2020

- p.18 Using cubical quad antennas on VHF
- p.24 Review: INRAD W1 Headset

- p.28 Siglent SDG1062X Function/Arbitrary Waveform Generator
- p.42 Review: SDRPlay RSPdx
- p.46 Design Notes: What technology is in smartphones?
- p.66 Minimalistic 500W LDMOSFET 2-30MHz RF amplifier (conclusion)
- p.68 Surprising six (DX with a 6m inverted-V)
- p.78 Antenna matching and all that
- p.80 The Father of Radiotelephony (Fessenden)

## NZART HQ Office Assistant

NZART is looking for a person to take up the role of NZART HQ Office Assistant. This new role is to provide replacement cover for the Business Manager/General Secretary from time to time, to cover for extended annual leave periods, sickness or other support as required.

The role is the same as that of the Business Manager/General Secretary, but will exclude the role of NZART's Approved Radio Examiner (NZART ARX). This role will be undertaken by other members of NZART.

The role is that of a casual employee and is not a full time role. It is expected that after a period of training that the person is expected to do a least one days work, each calendar month, twelve months a year outside any coverage for annual leave, sickness and the like. The purpose of this is for the employee to remain current with the day-to-day running of NZART HQ. The day required for each month will vary and not necessary be the same day.

### Description of Position

1. The Business Manager/General Secretary is appointed by NZART Council to provide the day-to-day running of the NZART Headquarters Office based in Upper Hutt.
2. The Business Manager/General Secretary reports to NZART Council.
3. The position requires the person to work from NZART HQ in Upper Hutt, so would ideally suit someone within the greater Wellington area. You must provide you own means to get to this location.

### Duties of the Position

1. As outlined in the Procedure Manual the Business Manager/General Secretary has daily, weekly and monthly tasks to complete.
  2. Daily tasks include the answering of telephone inquiries and emails. Postal services including the collection of mail from the PO Box. The entering of new members into the database, and well as maintaining updates to the existing membership. The processing of any banking. The answering of all calls for action from NZART Council and its members.
  3. Weekly tasks include reconciliation of the accounting software package. The backup of all computer systems at NZART HQ, including off site backups.
  4. Monthly tasks include preparation of Financial Reports of all monthly payments for NZART Council approval. Preparation of reports for Councils on Air Meetings held via Skype. Prepare and the recording of the Official Broadcast from NZART HQ. Provide a list of new members for the *Break-In* Editor (bi-monthly). Run from the membership database a list of members for the mailing of *Break-In* (bi-monthly). And other tasks required depending on the calendar month throughout the year.
  5. Attend monthly meetings of NZART Council as required via Skype if required.
  6. Attend if required the yearly AGM normally held over Queens Birthday each year.
  7. Submit an annual report to *Break-In* in time for the issue that contains Officers Reports for the Annual General Meeting of NZART.
- If you wish to apply please register your interest with a short resume for this position by responding to Debby Morgan ZL2DL, by email to <nzart@nzart.org.nz>.

# Bridge the Gap Programme: Masterton

By Shaun Evans ZL2CT <skawevans@hotmail.com>



On 8 November 2019, The Masterton Care and Craft Group hosted the South Wairarapa Amateur Radio Club Branch 82's 'Bridge the Gap' programme at the Masterton Senior Citizen Hall.

The aim of the programme was to give members of our community who would not get the opportunity a chance to go on air using a VHF radio transceiver and make contacts with amateur radio operators throughout the Wairarapa. Both the Wairarapa Amateur Radio Club (Inc) Branch 46 and the South Wairarapa Amateur Radio Club Branch 82 quickly showed an interest to participate. The Masterton Care and Craft community group certainly wanted to take advantage of the opportunity.

Bridge the Gap Supervisor and amateur radio operator Shaun Evans ZL2CT said that once the members of Care and Craft understood the basic concepts of using the microphone and coordinating their talk with the PTT (Push To Talk) button – they were well underway.

The programme started at 9:30 am with the Masterton Care and Craft group contacting members of Branch 46 via the 680 Rangitumau Repeater. At 10:30 am the programme then QSY'ed to the 715

Knoll Repeater to contact members of Branch 82. Everyone enjoyed the morning making contacts and look to the next programme in 2020.

Highlights of the programme were:

- a talk of mountain climbing with Judy and Paul London ZL2BEF from Masterton
- Neil who has some difficulties speaking – clearly spelling out his name using the universal phonetic alphabet to Morrie Vile ZL2ADP and Ted Byrne ZL2JTD both from Carterton. They returned spelling out theirs.
- Seymour Harris ZL2SY from Carterton talking with Colin about the old TV series Steptoe and Son and their other interests in model railways.
- Care and Craft's President Judy talking with Branch 82's President Elaine Byrne ZL2ELA about their grandchildren.

Everyone who participated received a Certificate with the Masterton Care and Craft group having



"Hello am I doing this right?" was Judy's first call to Paul London ZL2BEF. He returned with "ZL2 BEF hears you loud and clear and your doing a great job."

theirs presented by Elaine Byrne.

The Masterton Care and Craft would like to thank the following: all the participating Wairarapa Amateur radio operators from both Branch 46 and Branch 82 for giving up their time to support the programme. To NZART for their guidance and recommendations. Central Region Councillor Daniel

Vandenberg ZL2DRV for his support and the Masterton Senior Citizens group for providing the facility.

The next Bridge the Gap Programme will be in March-April 2020 with the hope to also one day connect with the National System for a morning's worth of operating.  $\beta$

Shaun Evans ZL2CT

## Te Puke Amateur Radio Club Inc. Branch 53 of NZART

### Market Day Saturday 28 March 2020

Paengaroa Community Hall, Old Coach Road,  
Paengaroa. 3189

Open 06:30 am - Sale at 10:00 am  
\$20.00 Per Table or \$25.00 on the day  
\$12.00 For Half a Table or \$15.00 on the day

As Always Plenty of Good Tucker and  
All Day Breakfasts from 07:30 am.

Motorhome Parking Available  
If you get lost tune into 147.175 or D-STAR 145.725

For Further Information and Table Bookings  
Ph. (027) 248-8664 or (07) 533-1029  
Email: <sydrowe@xtra.co.nz>



Care and Craft Helper Ngairi slowly becomes confident as she talks to Seymour Harris ZL2SY from Carterton. Seymour explained to Ngairi why we use call-signs and Q codes.

Next deadline for copy is  
10 March 2020

# Ten things to do, with a handheld radio: Awards and Contests

By K Barnsdale ZL3KB and Alan Chapman ZL3GX

This series of articles are intended to give the newcomer to ham radio an insight into some of the things you can do with a handheld dual band radio. This and other related articles are available on the Branch05 website <<http://www.chchamradio.org.nz/>>

## 6: Awards and Contests

The competitive spirit will creep into every hobby, and Ham Radio is no exception, many amateur radio operators take part in regular Contests and Awards throughout the year.

In a Contest, there will usually be just one winner, but Award programs have no winners, just certificates to treasure.

Note, the Awards information on the websites can be out of date, and confirmation of requirements should be sought before embarking on the accomplishment.

## Contests

Radio contests are normally designed around worldwide participation on HF bands, so unfortunately, a low power handheld would not be very competitive when up against the big stations. FM is still a valid mode in contests, but is rarely used as SSB can be received at greater distances.

## Awards

These are not so competitive as contests, but offer formal recognition of your achievements. Some Awards set challenges, such as making contacts with all regions of New Zealand, or maybe taking part in an annual activity setup by NZART each year; one year it was a "Worked All Railway Stations" fun activity.

## Summits on the Air (SOTA)

If you like tramping, you can try the SOTA program, and operate from as many hilltop summits as possible. There are awards for "activators" who ascend to the summits and "chasers" who either operate from home, a local hilltop or are even activators on other summits.

SOTA is operational in nearly one hundred countries around the world, each with its own Association which defines the recognised SOTA

summits within that Association. Each summit earns the activators and chasers a score which is related to the height of the summit. Certificates are available for various scores, leading to the prestigious "Mountain Goat" and "Shack Sloth" trophies. An Honour Roll for Activators and Chasers is maintained at the SOTA online database. Activating a summit is usually done with HF SSB radios, but can be achieved with an FM handheld, but a Yagi antenna, and even an amplifier, would be a great advantage.

## New Zealand Awards

Some of the awards that would be suitable for an FM hand held are:

### Christchurch Award

Christchurch amateurs to work 25 Christchurch stations; For the rest of NZ amateurs-15 stations; A valid Christchurch station is any station that is operating from within the metropolitan area of Christchurch.

Cost: ZL and VK NZ\$5.00. Applications and logs to Christchurch Amateur Radio Club Awards Manager, PO Box 1733, Christchurch Mail Centre, Christchurch 8140.

### WAZL (Worked All ZL)

Requires contacts with 45 different branches from around the country.

### WAD (Worked All Districts)

Requires one contact from each call district. (ZL1, ZL2, ZL3, ZL4) A ZL1 must be in the ZL1 district etc.

### ZL3 Award

Fifty contacts in the ZL3 district.

### National Parks Award

Requires contacts with two National Parks.

### OTC (Old Timers Club Award)

Requires contacts with ten different OTC members, you need to record their OTC number.

### NZWARO VHF/UHF Award (Woman's Amateur Radio Operators)

Requires contacts with ten different WARO members.

## More information

Award certificates normally cost \$5. Some rules may say less but send \$5 as the cost has gone up since the rules have been printed on the web.

The awards page of the NZART website is the best to get New Zealand information. <<http://www.nzart.org.nz/activities/awards/>>

The contests page here <<http://www.nzart.org.nz/activities/contests/>> and NZART contest dates are here: <<http://www.nzart.org.nz/activities/contests/vhf-uhf-shf-ehf-contest-dates/>>

Summits on the air information <<http://zl-sota.org>>

**Protect our hard-earned frequencies.  
Report intruders, see  
[www.nzart.org.nz/nzart/  
monitoring-service](http://www.nzart.org.nz/nzart/monitoring-service)**

## Local Government Liaison Officer (LGLO)

NZART is looking for a person(s) to take up the role of Local Government Liaison Officer (LGLO) from Douglas Birt ZL1BFS. Douglas has signalled his intention to retire from the position at the AGM in Greymouth in 2020.

The job description is here: <<http://www.nzart.org.nz/council/jobs/local-government/>>

### Description of Position

1. The Local Government Liaison Officer is an Officer appointed by NZART Council to retain a reference file of previous cases reported and to supply specialist advice for Radio Amateurs dealing with Local Government.
2. The Local Government Liaison Officer reports to NZART Council.

### Duties of the Position

1. Coordination of information of submissions made to Local Government concerning masts, towers, town plans and other matters relating to the operation of an Amateur Radio station.
2. Supply information and advice to Members and NZART Council as support and assistance in submissions to Local Government.
3. Maintain a reference file of skilled and informed people able to assist Amateur Radio Operators in their dealings with Local Government
4. Provide a contact point for Members and NZART Branches on matters relating to Local Government policies and plans.
5. Competently manage any budget or money approved by NZART Council.
6. Report quarterly to Council plus a written annual report by the 20th January each year. The annual report should also be submitted to *Break-In* in time for the issue that contains Officers Reports for the Annual General Meeting of NZART.

If you wish to apply please register your interest with a short resume for this position by responding to Debby Morgan ZL2DL, by email to <[nzart@nzart.org.nz](mailto:nzart@nzart.org.nz)>.

# VHF Scene

Simon Watt-Wyness ZL1SWW  
<vhfscene@nzart.org.nz>



Well it's the start of the New Year and hopefully full of DX! I hope that everyone had a great 2019 and onwards and upwards for a new decade! There's been some ground breaking efforts made by some regarding big microwave achievements, read on to see the action!

## Six Metre News

Ken ZL3OZ has been busy on 6 m and outlines his activities. "I have only made two SSSP (Short-path Summer Solstice Propagation) QSOs this season so far, one with CE6CGX on 22 December 2019 about -12 both ways, and one just lately in this month of January with LU7FA. Have seen Dale a few times but fleeting single decodes. Far less days with decodes from South America, averaging just one a week and then only a couple decodes. This despite the fact there are many more SA and Oceania stations on air and trying. My setup this season has been the 14 element rope beam as usual, and 300 W from IC-7300. My QTH is beset with trees with the beam looking into a row of Cottonwoods down a valley. Planning big for next season, high country site and long beams set on SA and NA.

Jack OA4TT was on air for a couple of three-day periods and managed to coincide about twice with openings but not as strong as last year. I saw him decode briefly once. Peru seems to be the hot spot for SA to Oceania signals, with OA4TT featuring strongest and most frequent this season and last for the few days he was on, there was only limited time available to Jack. Unfortunately, we do not have any other OA stations interested or known.

In general, we have seen the same pattern as last two seasons, where the propagation seems to be into southern ZL early in December up till a week after Solstice then mainly in ZL1 and VK over the summer peak. It remains to be seen if that will go as expected as the summer days shorten it will again fall back to be mainly southern ZL again as it has been last two seasons. To buck that trend is the hot spot of ZL1SG and ZL1RQ who seem to get special days of their own and normally feature if there is propagation anywhere else. PSK Reporter has been useful this season for me, as I see my signal appear across ZL and East VK minutes before any SA stations appear, again showing correlation with local Oceania Es.

One outstanding day was 21 December when we had many signals across ZL and east VK, which included TI5/N5BEK for the first time here in southern ZL, and the southern ZL4 guys also worked K9RX. Some of the others had XE as well. I was away from home in my 4X4 in the Omarabad area of inland ZL3 among the mountains, by coincidence through family matters. At the roadside layby near Lake Benmore the band suddenly opened and I received many decodes with Chile and Costa Rica in the same pass, received on a 10/6 dual band homebrew whip into ICOM IC-7100 and a 7 inch Tablet which was a nightmare to control from the Toyota Hilux (fat fingers). I was surprised at the ease of these decodes among mountains, and it was only the slowness of response with the tablet and 80W of my TX that I failed to QSO. It got me very excited as I thought it would be

UTC	dB	DT	Freq	Message
0843	-12	-0.3	1435 #	CE6TK VK4HJ -18
0843	-10	-0.5	729 #	CE6TK ZL4LV RR73
0843	-15	-0.4	1686 #	CQ VK4CZ QG62
0843	-16	-0.4	1890 #	CE2SV ZL3JT -20
0844	-20	-3.1	1316 #	VK4WTN CE6CGX R-16
0844	-23	0.2	1439 #	VK4HJ CE6TK R-12
0850	-17	-0.3	1204 #	ZL2WHO N5BEK EJ79
0850	-18	-3.2	1504 #	ZL1AKW CE6CGX RR73
0852	-21	-3.2	728 #	ZL4LV CE6CGX FF31
0852	-20	-0.4	1205 #	DE TI5/N5BEK R-19

Ken ZL3OZ's WSJT Receive Windows on a Tablet While Mobile.

great to be the first ZL to work mobile into SA. An hour later Dale CE2SV was decoded as I drove down a deep valley actually mobile at the time, a single decode at -23. I could not alert them on KST because there was no reliable phone coverage. (In the pictures it shows 313 as the frequency, but it was JT65 on 276 with the tablet connected via headphone socket.)"

Alan ZL1RQ and Graeme ZL1SG have been busy also in magic far north. The first opening of the DX Season to South America was on the 29 November 2019. CE2SV and LU7FIN both worked on JT65 50.276 MHz. The second opening on 17 December Alan worked LU5FF, LU9FVS, LU7FIN and CE2SV also on JT65. On the 21 December Alan worked OA4TT, CE2SV and CE6TK.

Graeme worked E6UFF, LU5DF, LU9FVS, CE2SV, CE6TK, CE6CGX, CE2EC, CA3SOC all JT65, CE2SV on SSB 110 5/5. The list goes on with many stations jointly worked between Alan and Graeme. CE6CGX, LU8YD, CE2SV, OA4TT JT65, and OA4TT on SSB.

Alan says the season has been patchy and slow to get going with many of same stations being worked on a regular basis.

## 2 Metres

In the last couple of months, we had had some small openings on 2 and 70 and above to VK. In the early days of November such as the second we saw quite a few contacts mainly from the North Island. Nick ZL1IU bagged many VK stations and a few of us further south got some as well. This carried on through 8, 10, 14-15 November and many QSOs on the 22nd.

The 7 December had a few stations out contesting and testing out equipment. A few microwave QSOs were had by some and most activity over ZL was from home stations or field stations active for the Sunday. It appeared many of us had prior commitments and could only put in a short appearance. It had to be noted that the ZL2QF team was on Mt Taranaki for the duration.

The 19 December was a real ripper with many in the north island working VK DX on 2 m upwards to 1296 MHz.

On the 28 December onwards has seen some great DX even down to VK7 as well.

## Southern VHF Report For September/October 2019

Peter ZL4LV outlines some things going on in the Dunedin and surrounding areas. It goes as such: "Summer is the anticipated period for 6 metre activity and as November day's progressed, time was spent monitoring the band. Early indications were from the north with 3D2AG in Fiji on 23 November and VK8AW on the 27th. Apart from the VHF Field Day in early December that was a virtual failure due to bad weather conditions it seemed as if 6 metres had not been turned on.

The past few summers had proved that contacts across the South Pacific to South America were possible, so my aerial was pointed in this direction each morning, the anticipated time for contacts. Digital mode JT65 on 50.276 is used. Then on 19 December the band opened, and contacts were made with CE6CGX and CE2SV. Then the next day the 20th it all happened. I was surprised to see the call N5BEK appear then later with prefix TI/N5BEK included, it was still a surprise. This was followed with contacts with CE6TK, CE6CGX, CE2SV, E1MEX, and K1RX. In other words, contacts with South, Central and North America on one day on 6 metres was something most unusual particularly at the sunspot minimum. Looking at my WSJT-X screen later I saw another American station had called me, but I had missed it as a visitor had distracted me at the critical time. Cliff ZL4AS at Balclutha also made some of the contacts.

On Sunday evening the 29th the band opened again this time to the north with contacts to Japan and Guam. These contacts were using the FT8 mode. This mode is faster but less sensitive than JT65 but better when signals are strong and many stations active. Since that time the band has been relatively quiet with only a few isolated South America contacts.

Two metre SSB activity continues most evenings on 144.2 MHz at 8:00 pm

with regular contacts to Roger ZL3RC and other Christchurch stations. The main ones active locally are Mike ZL4OL located at Waitati over northern Dunedin hills, Stu ZL4DC using his remote operated setup on the Otago Peninsular and myself ZL4LV behind the local hills on Saddle Hill. This variety of locations shows a range of different propagation modes. Contact with Christchurch is possible most times as is also on 23 cm. It is good to see a number of other locals join in on 2 m. Their limitations are inferior aerials and commonly vertical polarization. That they can see some activity should provide some incentive to upgrade their station and that operating procedures on VHF are no different to those on the HF bands.

At the time this report was being compiled on 6 January 2020, 6 m activity is still continuing mainly VK ZL but still a few South American can be worked."

### Contest 2019

Nick, ZL1IU was active on 3.4 GHz and worked Steve ZL1TPH at 151 km, Brian ZL1AVZ at 183 km, and Greg ZL1GSG at 190 km. Nick's station on the 9 cm band comprises a 85 cm diameter dish, 20 Watts at the feed, along with a low noise receive preamp.

Greg worked the 190 km path to Nick with only two Watts at the feed of his 90 cm dish. Ralph ZL1TBG was also active on the band. Simon ZL1SWW popped up on the Sunday from Point View Drive and exercised all bands up to 24 GHz with Greg except for 925 MHz.

The ZL4AA team of Terry ZL4TAE and David ZL4DK operated again from Mt Cargill Dunedin. Weather was windy but mostly dry. However, weather conditions further north meant there were fewer than normal stations active. Band conditions were also nothing special. They worked several Christchurch area home stations on all bands from 6 m to 23 cm, but conditions were such that other than 2 metres these contacts were difficult and sometimes few and far between.

It was good to hear the Christchurch branch station ZL3AC active however their location was such that the path south to us was obstructed and we only made one weak contact with them on 2 metres.

The highlight for the Contest was when Roger ZL3RC went hill topping on Sunday morning with his 5.7 GHz equipment and we managed to make a couple of contacts on this band at almost 300 km. Signals were clear and strong in remarkable contrast to the 70 cm and 23 cm contacts with the Christchurch home stations and the 2 m contact with the ZL3AC team only a few kilometres from Roger.

There were a great number of ZL4 area stations active which gave the ZL4AA team contacts from Invercargill, Queenstown, Owaka, and Ranfurly in addition to local Dunedin stations to help keep the log ticking over. They were very fortunate to get packed up (with the help of Kevin ZL4QD) before the weather really went wild on Sunday afternoon. There was lightning, heavy rain and some fairly large hail on the drive home through Dunedin.

### First Trans-Tasman terrestrial contact on 3.4 GHz

On the Saturday the 23 November 2019, the Tasman was crossed to VK on the 3.4 GHz amateur allocation. Stephen Hayman ZL1TPH/p (RF65JM) worked Kevin Johnston VK4UH/p (QG53TC) on SSB with 5/5 reports both ways. Path distance was 2193 kilometres.

The official date and time of the contact was the 22 November 2019 at 21:05 UTC.

Stephen reports: "Kevin VK4UH, along with the Scott VK4CZ, and Colin VK4MIL from the Brisbane VHF Group, VK4IF/p, had formed a VHF Contest Team, and operated portable from Mount Mowbullan, 200 km inland from Brisbane. This site is at 1100 metres in altitude and has sea views towards New Zealand.

It was arranged via email a week or so before, if band conditions looked favourable during the 23, 24th VK W.I.A Spring Contest would you be interested in activating Cape Reinga and attempting our first Trans-Tasman on 3.4 GHz? Two of three days before this event, the Hepburn tropospheric ducting charts looked very favourable, so he booked a motel in Kaitia



Kevin VK4UH on 3.4 GHz.

for four nights.

Kaitia was the base camp for a ninety minute drive each day to Cape Reinga. Cape Reinga also has sea views towards VK. One advantage of Cape Reinga is that it is generally 200 km closer to VK than the rest of New Zealand!

On the Saturday morning, after leaving Kaitia at 5:00 am in the morning, we set up portable from the SUV and listened on 144.100 MHz for any activity. The band to VK on VHF looked open with the low cloud and breeze from the West.

We waited a while and first worked VK4OX on 144.1 MHz, he was 5/7, and just after, VK4RF and VK4IKA were both 5/1. (Worked later were VK4DH and VK2ZT)

Then VK4IF/p, the Brisbane VHF Contest Station appeared, they were 5/9 with a very strong signal.

They then asked me to setup my dish and station on 3.4 GHz. That took fifteen minutes. With a call back on 144.1 MHz they were only 5/2. I told them give me a call on 3400 MHz anyway, or 3.4 GHz.

With his portable station he uses the new ICOM IC-9700 and use the two bands of 144 and 430, and the 430 MHz band is used as the IF or intermediate frequency for conversion up to 3.4 GHz.

He heard the VK stations straight away on 3.4 GHz.

They exchanged 5/2 - 5/4 both ways initially and then upped it to 5/5



Left to right Scott VK4CZ Colin VK4MIL and Kevin VK4UH.

both ways. An easy contact in other words, despite the high QSB which you get on microwave at distance. Kevin VK4UH then passed the microphone over to Scott VK4CZ and he worked him also. Colin VK4MIL assisted greatly in the background.

▣ continued on page 24



VHF Record Certificate ZL1TPH.



ZL3RC's 10 GHz Mobile Shack Setup.

continued from page 23

A new VK- ZL national distance record had been set, on the 3.4 GHz band with a path distance of 2193 kilometres.

Equipment at both ends was a one metre dish along with 30 Watts TX power and low noise microwave transverters. To add to that, the tropospheric duct assisted across the Tasman to VK. The VK end used a 142.1 MHz IF, and Stephen used a 430.1 MHz IF.

About QSB on 144 MHz, regarding the possibility of leading to higher band microwave contacts is something of interest. With tropospheric propagation to VK you normally get fairly constant signal strength on the 2 metre band, admittedly you do get the rolling slow QSB, but not the sudden and sharp drop with QSB which was experienced on this day. The same occurred on 144 MHz when he worked VK4OX on 2.4 GHz back in 2011.

Stephen's thinking on this subject is that entry level to the tropospheric duct is not optimum at one end, remembering one station was up at 1100 metres in VK, and the other in ZL only 108 metres above sea level.

There is a bit of conjecture regarding possible indicators. Some say you should never use 144 MHz as a guide to higher band propagation, you should use 432 MHz as the gold standard or benchmark. If, say 432 MHz propagation to VK is intense and strong, it will be open to VK on all bands up to 10 GHz."

### The First Ground-breaking Trans-Tasman Record on 10 GHz

It seems the time of year to break records. Roger ZL3RC and Rex VK7MO/2p made 2040 kilometre contacts on both SSB and digital modes. After watching the Hepburn map develop a very strong pattern between northern NSW and the West coast of the South Island Rex VK7MO and Roger ZL3RC set off to try and prove that ducts formed by these weather conductions don't have an upper frequency limit. The plan was for Rex to travel North up to the Victoria and the NSW Coast to a favourable site when the Hepburn map was predicting favourable conditions.

Rex had done some homework and along with Glen VK1XX they found a good site at about 430 metres ASL. Roger had a site, which he had used before, just north of Nine Mile River about 15 kilometres north of Grey-mouth in RE57pq which had easy access.

Roger was using a 1.13 metre dish which has a beam width of 0.7 degrees at 10 GHz, so he had to be pointing accurately in Rex's direction for this to work. The power level was 60 Watts.

On the second day they attempted contacts which were much stronger with the resulting contact that was at -10 to -11 probably stronger than that in real terms as QRA64 gets swamped at around -10. Moving to SSB after completing the QRA64 contact were strong with Rex was sitting at a good five S points above the noise on SSB and most of the time was pushing the S meter into the red above S9!

More details of this amazing contact will be in more depth in the

accompanying standalone article within this issue of *Break In*. It is a great read of how this progressed.

### Results of the 2019 Field Day Weekend Contest – 7/8 December

VHF-UHF-SHF-EHF Contests, as administered by the Auckland VHF Group Inc; on behalf of all VHF groups, including all New Zealand radio amateurs and supported by NZART.

Overall Winner	Station	Points
	ZL4AA	2956
	ZL1GSG	1879
	ZL1SWW	898
	ZL3AC	299
	ZL2VS	319

Band winner	Station	Points
6 m (50 MHz) StationPoints	ZL3AC	137
	ZL1GSG	125
	ZL1SWW	100
	ZL4AA	47
	ZL2VS	14

Band winner	Station	Points
2 m (144 MHz)	ZL4AA	720
	ZL3AC	150
	ZL1SWW	110
	ZL2VS	84
	ZL1GSG	76

Band winner	Station	Points
70 cm (432 MHz)	ZL4AA	432
	ZL1SWW	93
	ZL2VS	84
	ZL3AC	12

**Band winner**

23cm (1296 MHz)	Station	Points
	ZL4AA	583
	ZL2VS	132
	ZL1GSG	96
	ZL1SWW	59

**Band winner**

12 cm (2400 MHz)	Station	Points
	ZL1GSG	32
	ZL1SWW	32

**Band winner**

9 cm (3400 MHz)	Station	Points
	ZL1GSG	1010
	ZL1SWW	126

**Band winner**

6 cm (5760 MHz)	Station	Points
	ZL4AA	1174
	ZL1GSG	162
	ZL1SWW	63

**Band winner**

3 cm (10368 MHz)	Station	Points
	ZL1GSG	126
	ZL1SWW	126

**Band winner**

1.2 cm (24048 MHz)	Station	Points
	ZL1GSG	252
	ZL1SWW	189

**Greatest DX**

	Station	Distance
6 m	ZL3AC – VK2DIG	2208 km
2 m	ZL3AC - ZL2QF	488 km
70 cm	ZL4AA – ZL3RC	323 km
23 cm	ZL4AA – ZL3NW	318 km
12 cm	ZL1SWW- ZL1GSG	35 km
9 cm	ZL1GSG – ZL1IU	191 km
6 cm	ZL4AA – ZL3RC	299 km
3 cm	ZL1GSG – ZL1SWW	35 km
1.2cm	ZL1GSG – ZL1SWW	35 km

**Active Stations (54 in total)**

ZL1AKW, ZL1AVZ, ZL1BK, ZL1BRL, ZL1GSG, ZL1HI, ZL1IU, ZL1JA, ZL1JLM, ZL1NX, ZL1SWW, ZL1TGB, ZL1TPH

ZL2ALW, ZL2BF, ZL2CHAR, ZL2DEM, ZL2GD, ZL2IW, ZL2KG, ZL2OK, ZL2QF, ZL2TC, ZL2UV, ZL2VS

ZL3AC, ZL3DC, ZL3GA, ZL3GAV, ZL3GIG, ZL3IA, ZL3MR, ZL3NB, ZL3NW, ZL3OOC, ZL3OZ, ZL3RC, ZL3RJ, ZL3RX, ZL3SI, ZL3TMB, ZL3TCM

ZL4BC, ZL4CD, ZL4DC, ZL4DMM, ZL4HSV, ZL4JW, ZL4KT, ZL4LM, ZL4SA, ZL4SY, ZL4TH, ZL4UC,

**Active team members**

ZL2QF: ZL2TLF and five others, ZL3AC: ZL3RIK, ZL3KKW, ZL3UYJ, ZL2AYB, ZL4AA: ZL4DK, ZL4TAE

**Operator comments**

ZL1GSG (Greg): Fine and a bit windy. Work commitments meant my operation was from Auckland (Mt Pukematekeo carpark). Nice to have 6m open to VK2.

ZL2VS (Royden): Weather was ok on the Saturday but rubbish on the Sunday. Had to take down the 1296 dish and use a small Yagi the wind was very strong.

ZL4AA (Dave): Weather – windy on and off but mostly warm and dry. Lightning, rain and hail after packing up when we were driving through Dunedin. Band Conditions – Nothing special.

ZL2QF (Dave): It was a shite weekend and a lot of damaged antennas but as usual we had a great time with Branches 27 and 87 coming together to have joint weekend on the Stratford Plateau. There were six of us up there and we roughed the night out, rocking and rolling in the gale force winds, thunder and lightning and very heavy rain. What a weekend!

**Contest Managers Comments:**

Poor weather throughout the country over the contest weekend resulted in a lower level of activity. Weather was particularly bad in the lower and central North Island with regular contest stations ZL2BKC and ZL2WHO deciding not to take part. A number of regular ZL1 contesters were unable to take part due to other commitments.

Regrettably, the log for ZL2QF who operated from the Stratford Plateau was not received in time but was used as a check log. Thanks Dave ZL2TLF for the log.

Effective January 2020, we will have a new Contest Manager – Greg Storz ZL1GSG is taking over and he will be assisted by Simon ZL1SWW. All other contact details remain the same.

**2019 VHF-UHF-SHF-EHF CONTEST CALENDAR**

Effective January 2020, we will have a new Contest Manager – Greg Storz ZL1GSG is taking over and he will be assisted by Simon ZL1SWW. All other contact details remain the same.

**DX Weekend Contest**

All bands 6 m and up. Saturday 8 February and Sunday 9 February 2020

**Low Band Contest**

All bands 6 m up to and including 70 cm. Saturday 4 April and Sunday 5 April 2020

**Microwave Contest**

All bands 23 cm and up. Saturday 3 October and Sunday 4 October 2020

**Field Day Contest**

All bands 6m and up. Saturday 5 December and Sunday 6 December 2020

For all contests, the operating periods are 5:00 pm to 11:00 pm on the Saturday, and 7:00 am to 1:00 pm on the Sunday, NZ local time. The rules for VHF-UHF-SHF-EHF Contests, as administered by the Auckland VHF Group; on behalf of all VHF groups are available on the NZART website: <<http://www.nzart.org.nz/activities/contest-rules/rules-vhf-and-above/>>

All contest logs should be sent, to arrive within two weeks, to: <vhf-contest@nzart.org.nz>

Or by mail to: Contest Manager, PO Box 10138, Dominion Road, Auckland 1446.

**Summary**

Many thanks go to the contributors who help make this column happen with their input – ZL1RQ/ZL1SG, ZL1TPH, ZL1GSG, ZL3OZ, ZL3RC, ZL4DK, ZL4LV and others. If you have input and pictures for the columns ahead; such as DX activity reports, repeater installation, branch activities, snippets of interest, technical items etc, please send to Simon ZL1SWW at <zl1sww@nzart.org.nz> or <vhfscene@nzart.org.nz> or *Call Book* addresses. (I also accept large picture files sent via email).

**REMEMBER:**

Leave a three second pause between overs when using repeaters.

Someone else may have an urgent message.



## Solar Cycle 25 Prediction

On 9 December 2019 the NOAA/NASA co-chaired, international panel released their latest forecast for Solar Cycle 25. The forecast consensus: a peak in July 2025 (+/- 8 months), with a smoothed sunspot number (SSN) of 115. The panel agreed that Cycle 25 will be average in intensity and similar to Cycle 24. Additionally, the panel concurred that solar minimum between Cycles 24 and 25 will occur in April 2020 (+/- 6 months). If the solar minimum prediction is correct, this would make Solar Cycle 24 the seventh longest on record (11.4 years).[1]

So, should we believe it? Well for Solar Cycle 24 they predicted a smoothed sunspot number of 90 and it came in at 82 albeit with a maximum nine months later than predicted. Therefore, it would be foolish not to give credence to their latest prediction. It certainly does seem though we are settling into a period of weak cycles. However, that does not mean the high bands won't be open, far from it. If Cycle 24 was anything to go by, expect plenty of DX on 15 m, 12 m and 10 m although you may need more than a piece of wet string hanging out the window to work them.

## Portable Antennas

Doing the Summits on the Air (SOTA) programme has meant a lot of investigation into portable antennas. The considerations are quite different to what you might do at home. Size and weight are the first issue as you have to carry everything which generally means wire antennas and lightweight collapsible poles. I had been using a SOTABEAMS ten metre fibreglass pole but recently changed to a lighter six metre pole

which is far more manageable.[2] The effect of my antenna now being mounted a couple of metres lower than before is negligible, especially when you are sitting on a hill.

Initially when I started with SOTA I used a linked dipole. The antenna was cut for 60 m, with links on each leg I could open and close to make it resonate on 40 m, 30 m and 20 m. Being a resonant antenna meant my 5 watts was heading out into the ether but it had one major downside. Every time I wanted to change bands I get to get up, undo or do up the links as the case maybe. If they were high up then I had to lower the wire as well to reach them.

After some research on alternatives I gravitated to an end fed antenna with a 9:1 unun and counterpoise. Unlike the dipole which provides a good match to your 50 Ohm coax (and therefore your rig) as it is fed at the middle, the end fed impedance at its feedpoint is in the region of several thousand Ohms. Even with the 9:1 unun which drops the impedance by a multiple of nine on the band in question, you still need an antenna tuner. Luckily my Elecraft KX2 had an inbuilt one but if your rig doesn't then you will have to look at adding one. The plus side is you simply need to retune the antenna when you change bands without getting up. The radiator is forty one feet long which is non-resonant on any band. The counterpoise is about thirty five feet which allows me to match the antenna on 60 m as well the bands above. It is hardly efficient on 60 m but I have had QSOs up and down the country with it. On the higher bands I haven't noticed a lot of difference from the dipole. I looked at building the 9:1 unun but a Google search discovered a



*Fox Peak with Mt Cook in the background.*

reasonably priced 9:1 unun by QRP guys which met my needs.[3]

Geoff ZL3GA has also been experimenting with end fed antennas in particular End Fed Halfwave Antennas (EFHW) and he sent me the following notes.

I had been wanting to try a 40 m EFHW for a while. It is (obviously) twenty metres of wire and for my SOTA use, is rigged as an Inverted Vee with the apex at 5.7 metres on my telescoping fibreglass pole. Of course, this length is also resonant on 80, 20, 15 and 10 m too so is very versatile.

As it is a halfwave (or multiple thereof), the feed impedance is very high at the end (~4700 Ohms) and outside the range of most internal rig tuners. Mine is fed with a very simple coupler consisting of a T96-6 toroid transformer with a twenty one turn primary (high impedance) winding with a Jaycar Polyvaricon variable capacitor in parallel to resonate it (see Figure 1). The Variable Capacitor is wired with the two gangs in parallel to give  $60\text{pF} + 160\text{pF} = 220\text{pF}$ . The two trimmers are set for minimum capacitance so it will resonate on 15m.

The Secondary (low Z) winding is three turns wound over the earthy end of the primary. Wire diameter is not critical – I used 0.5 mm enamelled copper. The windings occupy about  $\frac{3}{4}$  of the toroid and you can stretch or compress the turns to give resonance from 40 m – 15 m into a 4k7 Ohm resistor. I haven't worked out a power rating but I wouldn't use any more than 10 W CW – the limiting factor being the breakdown voltage of the variable capacitor. This power seems to be the general consensus in all the articles I have read. KX0R has presented a few versatile tuner ideas on the SOTA Reflector [4]. Peter VK3YE has several designs on his website [5] and in his excellent e-book "Hand-Carried QRP Antennas" available

from Amazon for about USD\$5. Great value.

With a 2 metre counterpoise on 40/30/20 m it tunes to 1.3:1, no tuner needed. On 17 m it needs a very short (or no) counterpoise, about 30 cm long and also resonates nicely there and on 15 m.

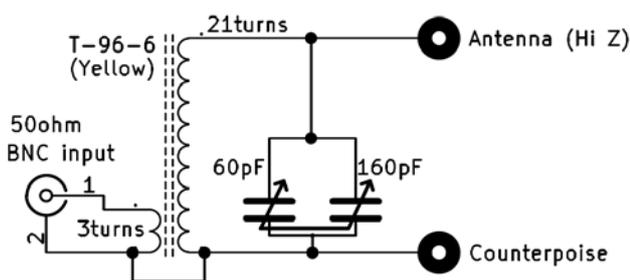
The radiation pattern (as an Inverted Vee) is ideal for SOTA in ZL. On the low bands there is lots of high angle radiation and it's pretty well omnidirectional - great for ZL NVIS on 40 m and VK on 30 m. On 20 m it starts to behave like a Half Square, with gain (4 lobes) to the broadside direction. So, if it is set up to roughly North/South, the gain comes in on the high bands to the sides where we want it for VK and USA. I have only used it on one activation and it went pretty well. I will need to try it a few more times to see if the theory works in practice!

I've also tested the fifty eight foot wire with thirteen foot counterpoise recommended by Bruce Prior N7RR. Again, Inverted V config and the KX2 tuner pulls it into line nicely on all bands, 80-15 m. No UNUN, just the wires and the Banana to BNC adaptor into the Elecraft KX2. I've yet to try this out on a summit. *Thanks Geoff!*

I recently tried the fifty eight foot/ thirteen foot counterpoise wire end fed Geoff describes on a summit and it worked reasonably well although infuriatingly mine would not load on 30 m. I did work around ZL on 40 m and into VK on 20 m mostly CW. As he notes you need to be careful with transmitter power when experimenting with end fed antennas. In particular with ununs make sure the toroid can handle the power you are going to put into it.

## Fox Peak – a SOTA 10 point activation

The largest number of points you can get for activating a SOTA summit is ten (excluding the three-point



*Figure 1.*



*Ye scribe at 1900m Fox Peak in the Background.*

winter bonus). Unfortunately, due to the quirks of the scoring system the ten pointers in the South Island are all over 2200 metres in height and therefore generally beyond the ability of the average ham to climb. After a bit of research, I came across Fox Peak which is near Fairlie. Although 2330 metres high, there was a ski field there and if I could gain permission to go up the access road, then the climb would be a manageable 1000 metres, as opposed to 1700 metres and probably an extra hour or two of walking, if I couldn't. Luckily the ski field club and landowner were happy to give permission. I then invited David Nicholson ZL3DRN to join me as it would not be the wisest move to do this on my own. David is an accomplished climber.

The ski field is a three-hour drive from Christchurch so we left town at 5:45 am and by 9:00 am we were underway. Immediately we started climbing and generally followed the ski tows until they stopped below the peak at 1900 metres. At this point the tussock gave way to shingle scree. From there we faced a choice. Go right and climb a ridge to the top which looked easier but longer, or head straight up to the peak which looked shorter but more technical. We decided the latter. The view by now was spectacular and it seemed odd to be above the clouds, which it appeared, stretched all the way back to Christchurch.

After a few tricky bits we were on the summit. The view was stunning. Once we had taken the obligatory photos we got down to setting the radio gear up. We were extremely fortunate with the weather as there was hardly a breath of wind which allowed us to put the pole up on the ridge of the peak itself. It would have been extremely difficult to do otherwise with there being quite

a drop off on either side of loose scree. A sharp breeze did come up but we put enough rocks around the pole and added a back stay to keep it upright. The breeze caused us to perch on the south side of the peak.

There was quite a crew waiting for us on 2 m FM. David and I had the required four contacts inside two minutes to each get the ten activation points. This also included contacts as Summit-to-Summits with Ian ZL3GIG on Mt Herbert and Rick ZL3RIK on Mt Pleasant, near Christchurch. According to the SOTA database they were 158 kilometres away so a new 2 m FM distance record for me. We were only using a 5 Watt handheld with a rubber duck antenna.

On HF David did SSB and I did CW, both using my KX2 and 10 Watts. David managed his first SOTA VK QSO's which was a thrill. CW was slightly disappointing, especially 20 m, although it was good to work Allen VK3ARH on a VK summit on 30 m. All up I had twenty four QSO's and David around the same.

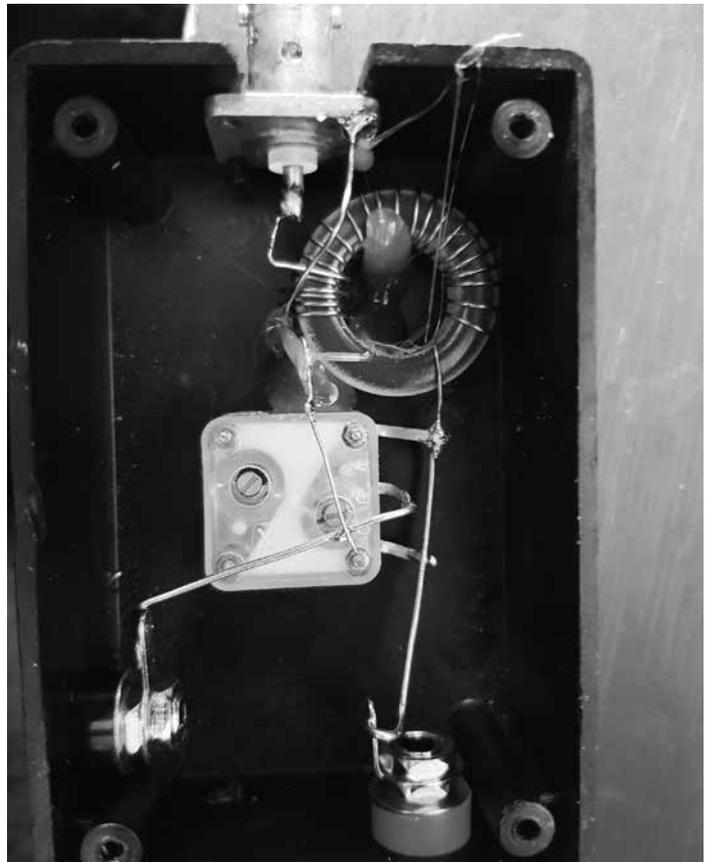
Rather than go back the way we came, we went down the ridge that we could have come up (interestingly if we had come up this way the last part of the climb would have been rather challenging due to the shingle scree). A 200 metre snow slide (great fun) down the side of the ridge and about a third of the way along it helped speed up our descent. A couple of hours and a lot of rock hopping later and we were back at the car. It was a day I will not forget any time soon.

#### **NZART Portable Activity Day**

On 1 January 2019 saw your scribe, and judging by the number of stations heard, a whole lot of other hams go portable for the NZART Portable Activity Day. I chose Peters Hill in the St James Range North Canterbury as my portable QTH and had a great time. 40 m SSB was absolutely humming and it was great to work stations up and down the country (and VK).

#### **The Next Decade**

The end of a year, or in this case decade, is often an excuse for the media to look back at changes over that time. Rather than do that I thought I'd look forward as to what



*ZL2GA's Coupling unit.*

the next ten years holds for DX'ing. There are no prizes for guessing that technology will be at the forefront of advancement of DX'ing (along with the inevitable grumbles that it's not real radio). Looking into my crystal ball I can see a new digital mode(s) developed for DX'ing which supplant FT8 in terms of QSO speed and sensitivity. Remote station use will become more and more common and manufacturers will respond with plug and play setups. A remote station will be permanently established on a DXCC entity in the top fifty most wanted list. Also, the first DXpedition to operate remotely from a boat anchored off a wanted DX entity will occur. Manufacturers will also develop an interface with the likes of Amazon Alexa and Google Home so your rig can scan the band for DX you need while you are doing something else. When new DX is found your smart speaker will advise you of this and on your command QSY your rig to the frequency and set the split for you to come in and work the station (or if SSB do it from your smart speaker). Too much controversy you will also be able to tell Alexa or Google Home to work it for you.

Bureau QSLs will all but disappear as hams adopt electronic QSLing as

standard due to sustainability concerns and the continuing erosion of the postal service. Direct cards will persist especially for DXpeditions. Governments will indefinitely stop access to some DXCC entities due to environmental concerns. In turn this forces the ARRL to revise its rules around what is considered a DXCC entity. On a more positive note the ARRL will also have to consider whether to add the moon as a DXCC entity as the first two-way amateur radio QSO will happen between an operator on the moon and an earth-based ham. The Elser-Mathes Cup will not be awarded (Google it). Finally Cycle 25 will provide plenty of opportunities for DX.

Good luck in the pile ups and don't forget the split button!

*73, Mark ZL3AB*

#### **References:**

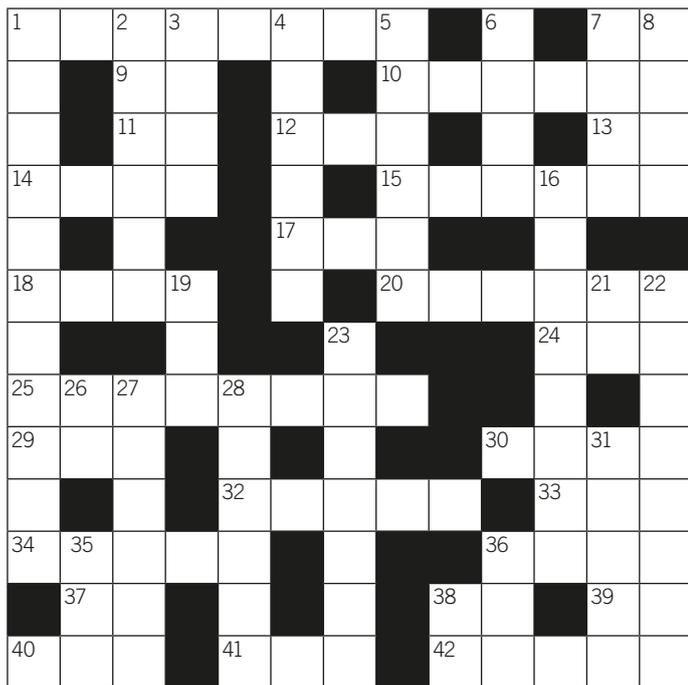
- [1] <<https://www.swpc.noaa.gov/news/solar-cycle-25-forecast-update>>
- [2] <<https://www.sotabeams.co.uk/compact-ultra-portable-6-m-19-6-ft-mast/>>
- [3] <<https://qrpguys.com/qrpguys-40m-10m-ununtenna>>
- [4] <<https://reflector.sota.org.uk/search?q=kx0rv>>
- [5] <<http://vk3ye.com/>>

# ZL Crossword 46

By Graeme Hunt ZL1ANH

## QSL Bureau

Ivan Horn ZL2ATU  
<qsl@nzart.org.nz>



### Clues Across:

1. Outdoors in February (5,3)
7. An appreciation from Ankara prefix (2)
9. - - II across the Atlantic to Dubai (2)
10. Not digital (6)
11. From Russia, prefix (2)
12. Possess (3)
13. Short grief from an under-officer (2)
14. An antenna that might be on your leg (4)
15. Tx on and off to send message (6)
17. Ovine girl (3)
18. On both sides of your nose (4)
20. Worn away (6)
24. Builder needs a dog and one of these (3)
25. All the ZLs are in it (8)
29. Paramilitary organisation (3)
30. Inflammation on the eyelid (4)
32. Covers over aero engines and chimneys (5)
33. He is from J.R.R Tolkien and most unpleasant (3)
34. Into the microphone (5)
36. Obnoxious child (4)
37. Either \_ (2)
38. Domain address for NZ firms (2)
39. - and fro (2)
40. Too many on TV (3)
41. Where you live, slang (3)
42. H2O (5)

### Clues Down

1. Wavelengths (11)
2. Same as (6)
3. Connecting wire (4)
4. One way traffic with these semi-conductors (6)
5. An American phonetic (6)
6. Scared of (4)
7. Not yet a city (4)
8. Excited (4)
16. Henry lives in this (8)
19. Influences the ionosphere (3)
21. Phone home from Addis Abbaba
22. After the IF stage (8)

**G**reetings and a Happy New Year to all DX'ers and other readers.

I thought that seeing this is the first magazine for a new decade, I would publish an up to date list of all closed Bureau's.

I would ask that DX'ers take note of the alterations and please do not send cards to the New Zealand QSL Bureau for deleted entities. This list was compiled from information obtained from the International Amateur Radio Union (IARU).

### Prefix

3B  
3DA  
4J  
7R  
9L  
A3  
A9  
C2  
C5  
C6  
CN  
D4  
H4  
HH  
HV  
PZ  
ST  
SU

### Bureau

Mauritius  
Swaziland  
Azerbaijan  
Lesotho  
Sierra Leone  
Tonga  
Bahrain  
Nauru  
Gambia  
Bahamas  
Morocco  
Cape Verde  
Solomon Island  
Haiti  
Vatican City  
Siriname  
Sudan  
Egypt

V3 Belize  
V4 Saint Kitts & Nevis  
V7 Marshall Islands  
VP2E Anguilla  
VP2M Montserrat  
XY-XZ Myanmar  
Z2 Zimbabwe  
ZA Albania

In the last issue, I mentioned about the proposal to shift the Wanganui Post Office facility to Wilson Street. From a secret squirrel informant, it appears that the green light is about to be energised. At the existing Post Office, some lockers have been installed, so no more waiting in the queue to receive DX and ZL Parcels. The mailroom staff now place a key in Box 857 which activates a selected locker. Once the parcel is removed the key is returned through a drop box slot. A great idea, which also means that I can collect mail at any time of day and on weekends. The system appears very secure, a code is needed to gain entry through the closed door during non-open times. It is understood that this system will be implemented at the new building

*73 and good DX, de Ivan Horn*

*ZL2ATU*

*New Zealand QSL Bureau*

*Manager*

## Is your local District Plan under review?

Doug ZL1BFS <lglo@nzart.org.nz>

NZART's Local Government Liaison Officer is available for assistance and advice.

Don't be caught out when your local District Councils' District Plan is up for review, keep Doug in the loop!

23. Better than reflected (7)
26. CW sign off (2)
27. Heavyside, E and F (6)
28. Copy on to another media (6)
31. Angry (5)
35. Being cast on your Iphone (3)
36. Large snake (3)
38. Morse (2)

**Answers to ZL Crossword 46 on page 40**

# Monitoring Service

Monitoring Service Co-ordinator: John Martin ZL1GWE  
[monitoring@nzart.org.nz](mailto:monitoring@nzart.org.nz)



Greetings to all, including Short Wave Listeners and contributors. Happy New Year to all.

During 2019 and through to November-December 2019 reporting period, we have been deluged within Region 1 with Over the Horizon Radar (OTHR) on 40 metres; to the point that Region 1 was asking all authorities to make formal complaints due a combination of both Russian and Chinese systems.

Within Region 3, we have our deluge on an almost daily basis throughout the Christmas and New Year festivities – inundated by both Russian and Chinese OTHR systems. Yet, many seem to know it happens, and just ignore it totally. Why does this happen? Because both Russia and China rely on the International Telecommunications Convention Chapter VII Special Provisions for Radio: Article 48 – which states “...Installations for National Defence Services; Member States retain their entire freedom with regard to military radio installation.....”.[1]

The next World Radio Conference (WRC) occurs in November/

December 2020. Given the likelihood of Sunspot Cycle 25 starting in the next four months (apparently), it will only increase the level of OTHR activities and intrusions into our primary radio spectrums. It is about time, we added our voice as one body to complain about the abuse and interference occurring. This does not mean, we cannot do anything about it, it means we have to report incursions, and keep on reporting them to indicate the cycle of abuse, which is going on.

As Region 1 members recently stated “have we lost 40 metres”, the same situation could occur on 20 metres as well. So make a New Year’s resolution to report incursions. Do not ignore it. We have the facilities to confirm the source using the KiwiSDR receivers, which work very well indeed. Why not set one up to experiment and get those reports coming in.

We have to persevere here, we cannot simply give in, because it appears too hard annually to solve, regardless of whether you are using traditional communications systems

or digital ones. Learn some new skills and adopt a growth mindset instead of a fixed mindset. As an example (see the picture), here is a recent screen dump of using KiwiSDR <<http://kiwisdr.com>> receivers to track down the source of a Chinese interference source.

On a good note, on his recent announced retirement: Wolf DK00M, was awarded the International Amateur Radio Union (IARU) President’s Diamond Award for his outstanding contribution to amateur radio spectrum defence through leadership of the IARU Monitoring Service. [2] Which is well deserved, in my opinion.

## Intruder System Observer League Table 2019 (up to December 2019)

Contributor Name/Call-sign	Number of verified reports
John – ZL1GWE/5WOJM	192
Ian – ZL2AIM	10
Mike – ZL2CC	4
Graeme – ZL2APV	2
Gary – ZL1IFB	2
Jim – ZL1LC	2
Peter – ZL2IKK	1
Carl – ZL3CX	1

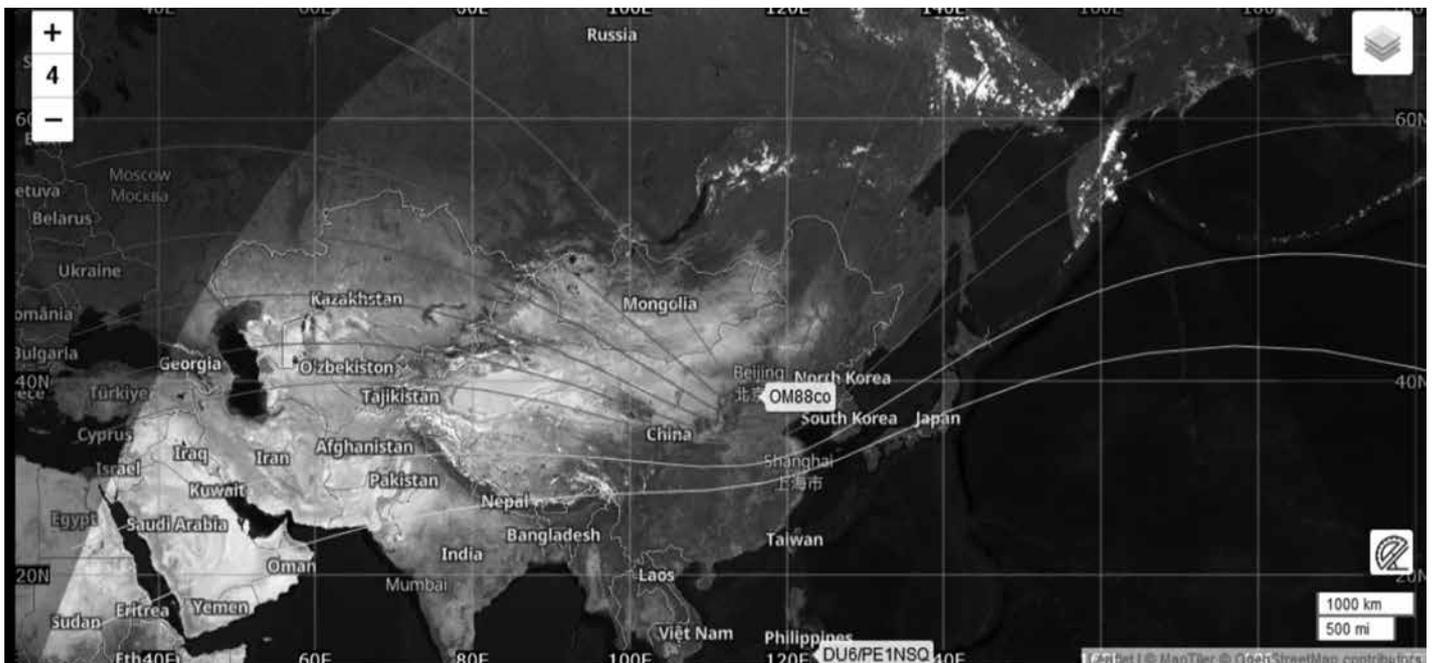
Thank you for all contributors. If you have a signal you cannot identify, please provide an audio sample, and we will attempt to recognise it for you. Please report intruders to: <[monitoring@nzart.org.nz](mailto:monitoring@nzart.org.nz)> or <[intruderwatch@googlegroups.com](mailto:intruderwatch@googlegroups.com)> or <[intruderwatch@yahogroups.nz](mailto:intruderwatch@yahogroups.nz)> or <<https://www.facebook.com/groups/79243702154/>> or to your favourite DX Cluster. Please include, if possible, the frequency, time in GMT or UTC, mode, strength and direction (if available). A real bonus would be an audio sample, long enough for identification purposes and any observations you have, including a screenshot – this really does help. If you have any questions, do not hesitate to contact me directly.

73 John ZL1GWE

## References:

- [1] <<https://www.itu.int/council/pd/constitution.html>>
- [2] <<https://tinyurl.com/rob6eyr>>

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# Digital Modes

Murray Greenman ZL1BPU  
<digitalmodes@nzart.org.nz>



## Antenna Analysers, antennae, the KiwiSDR, SDR receivers.

### New NanoVNA models

I recently dropped my NanoVNA, which did it no good at all, as the display no longer works. I pulled it apart to see if there was anything obvious, but no luck. It still worked fine with a computer or tablet attached, so was still useful. This was however a very good excuse to buy a newer one! There are two newer models, one called the NanoVNA-F, with a large screen, larger battery (and larger price). And another called the NanoVNA-H, which has improved frequency coverage, improved firmware, better shielding (which gives improved dynamic range) and a wider frequency range.

However, perhaps the most obvious improvement to both models is the housing. They now have a proper ABS moulded case, so there is no risk of dropping things into the 'innards', and are therefore better protected from ruffians like me.

The NanoVNA-H came in a nice presentation case. The frequency coverage (using harmonics from the Si5351 for the higher frequencies) is now continuous from 50 kHz to 1.5 GHz, which will interest the 23 cm enthusiasts. It has an improved menu structure and an instruction sheet, making it easier to use. It has additional functions, such as a battery level indicator and further analysis options including various transforms allowing impulse response, time domain reflectometry and velocity

factor measurement.

The NanoVNA-F, while larger and likely easier to read, at present appears to have none of the functional upgrades I've just mentioned?

There is now good support software for the NanoVNA. Perhaps the most useful is NanoVNA-Saver V0.1.2,[1] but there is also quite good software for the Android tablet. [2] I've not yet found any support software for Apple platforms. I prefer to use the unit stand-alone, which is undeniably the best way to assess an antenna in the field, but for workshop use (with amps, filters, traps etc) the PC software is useful. This allows further analysis, and also allows you to easily capture what you see for later comparison, or to pass your results on to friends.

The major strength of the NanoVNA (or any Vector Network Analyser) is the ability to make vector measurements and easily show the relationship between phase and

impedance to frequency, for example as a Smith Chart. For those of you who don't want to get involved in such notions (although I didn't find it difficult to learn enough to be useful), you might consider one of the new breed of hand-held Scalar Analysers. These are easily found on mail order sites. There's also the well regarded KVE-60C Vector Analyser which is small and rugged and doesn't show Smith Charts, just conventional impedance (X, R and Z) and SWR graphs.

### Magnetic Loop Antennae

There has been a recent local resurgence in interest in these small antennas, encouraged by the ability to now measure performance using a VNA. There has been a lot of hype and misinformation over the years about such antennae, from the sceptical to the magical, which a group of local users is gradually weeding out. There are two main types of

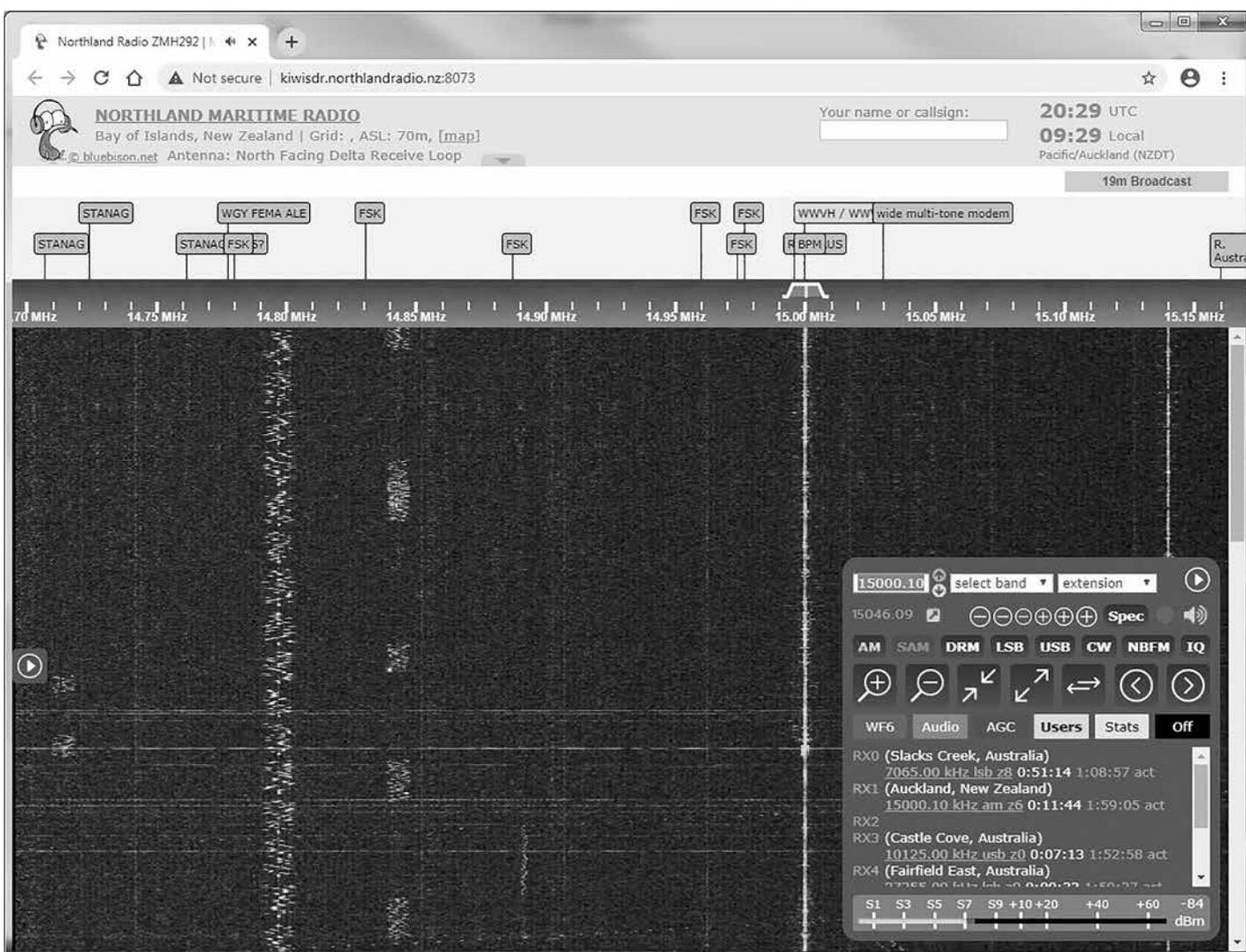


Figure 1. The Northland KiwiSDR.



Figure 2. The KI7OJL SDR Receiver.

magnetic loop (so called because they are less than a quarter wavelength in circumference and thus have nearly constant current around the loop, and are not responsive to electric fields such as interference). This is in contrast to the full-wave loop and the cubical quad, which are quite different devices.

The two main types are the top-tuned type, which are either link-loop or gamma-match coupled, and the bottom-tuned type, largely following the capacitive 'Army Loop' coupling. The Army Loop type is much easier to make, more portable and easier to tune, but not easily rotated (although you could use two loops at right-angles), while the top-tuned type is best for fixed use on a rotator, mostly for the higher bands, and potentially offers better noise balance, but you need a motorised tuning capacitor, and use copper tubing for the loop. This type is therefore more expensive to make.

We have found that using signal strength from a remote receiver (such as a KiwiSDR) is a reliable way to measure performance, provided you make comparison measurements at the same time of day.

#### KiwiSDR

These devices are high performance remote operated radio receivers. Their capability and frequency coverage varies with installation, but in general they operate from LF to 30 MHz. There are over 500 receivers available on the internet, including six in New Zealand.[4]

These receivers are operated from

a web browser, rather like using an SDR on your own computer. There is a slight delay due to processing and internet transfer. It takes a while to get used to the interface, but essentially you can dial up any frequency you want, and expect excellent reception. Some receivers have well sited antennae and very low noise, but not all, so shop around. The receivers operate AM/LSB/USB/CW and some other modes (specifications vary). Not all web browsers work with these receivers: I suggest Chrome or Firefox. Brief instructions are shown on the screen, and there is a good introduction on the web, along with operating instructions, both for operators and users.[5]

KiwiSDR receivers make really useful test receivers for your experiments. You can transmit to them, measure your signal strength, and hear yourself come back, slightly delayed. In a way this delay is useful, especially if you are interested in your audio or keying quality. I'm currently listening to WWVH on 15 MHz AM via a station in the Bay of Islands, Northland. Its antenna is a north facing delta loop. The signal is perfect copy, S7 with some fading, noise level about S3. This is a particularly good receiver.

These receivers can be a really useful adjunct to a QSO when reception is difficult due to local noise, and are also great tools for propagation experiments. Each receiver can serve four users at a time, each on a different frequency and mode.

The KiwiSDR hardware is a small single board which sits on top of a

BeagleBone processor board. You could buy and install your own, but they are expensive, and commit you to a full-time fibre internet connection (static IP), a top-notch broadband antenna, and you need a working knowledge of Linux and internet connections. The receiver includes GPS for timing and location purposes. The complete working unit including the BeagleBone board costs USD\$300 from Amazon. You could pay at least as much for a good broadband active antenna.

While it's an attractive idea to have your own remote receiver such as a KiwiSDR at a quiet country site (say your beach house or mountain retreat), remember that it needs power and full-time internet connection. If you use a cellular wireless connection, the costs will quickly mount up.

#### Antenna Selection Guide and Demo Kits

I recently had Texas Instruments Application Note AN058 [3] brought to my attention by Andrew ZLIWJQ. While specifically about VHF and UHF antennae, the theory section is more general in application, as it starts with a discussion of why we use quarter-wave related hardware for most efficient power transfer.

TI offer a development kit, with example antennae, the CC-Antenna-DK, mentioned in the Application Note, and another is available from Amazon and others (search 'NanoVNA demo kit') for just USD\$17. This one includes low pass, band pass and high pass filters, standard inductors, capacitors and loads, of more use to those interested in HF, and is directly aimed at the NanoVNA, so includes appropriate cables.

#### Stand-Alone SDR Receivers

I mentioned a while back an interest in stand-alone SDR receivers that

worked like a conventional receiver. Here's a cool one (Figure 2) based on a cheap mini-PC, an SDR and a box of knobs. It uses HSDSDR, a V3 SDR and an Arduino to read the controls and interface with HSDSDR. The receiver looks easy to use. Search for 'KI7OJL SDR' and you'll find it. Unfortunately there are no technical details available yet.

There are some other interesting SDR receiver options on the RTL-SDR blog. SDRPlay also has a useful blog. I love their video about recycling a CR-100 'boat anchor' as a modern receiver!

#### Final Finals

If you are interested in unusual modes and SDR reception in general, have a look at DK8OK's web page.[6] Nils Schifffhauer DK8OK has been involved in digital modes and related subjects for probably as long as I have. In 2001 he published a useful book about PC sound card software for Amateur Radio (I have a copy). While the book is a bit dated now, it is clear that he is interested in not just modes amateurs transmit, but anything you might find out there in the ether. Check out the web page – he has information on HF DL, GMDSS, the HAARP project, ALE, and reviews of various SDR software and hardware. He also covers the interesting business of time-of-flight direction finding using multiple receivers and time stamped logs.

#### References:

- [1] <<https://tinyurl.com/wfm8pbt>>
- [2] <<https://tinyurl.com/veot6lh>>
- [3] <<http://www.ti.com/lit/pdf/swra161b>>
- [4] <<https://sdr.hu/?q=new+zealand>>
- [5] <[http://kiwisdr.com/ks/using\\_Kiwi.html](http://kiwisdr.com/ks/using_Kiwi.html)>
- [6] <<https://dk8ok.org/page/1/>>

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# Letters To The Editor

All Letters to the Editor must be signed and include the author's full name, call-sign, (if applicable) and address. Opinions expressed here are those of the author and do not necessarily reflect official NZART policy.



## Letters to the Editor: guidelines to contributors

Letters to the Editor should be concerned with Amateur Radio and normally not exceed 400 words. Break-In follow the guidelines given on page 4-3 of the 2002-2003 Call-book "Standards of language, and topics best avoided". Accordingly sex, race, religion and politics are not acceptable subject matter.

## Duzall substitute

Some will remember Duzall soldering flux as a sovereign remedy for connecting coax braid to the reluctantly-accommodating plated body of a PL259 ("UHF") plug. Sure, it was a bit acidic – but a big hot soldering iron took care of that! The original Duzall seems to be no longer available. But COMWELD 965 claims to be a "Duzall equivalent". Google it for various New Zealand retail suppliers. A 125g \$16.00 bottle will probably last you the rest of your life!

Tony ZLITS  
Mangawhai, Northland

## National System and Free Loader Branches The Editor

Recent Letters to The Editor concerning the National System and "free loader" branches demand a reply from one of those "free loader" branches. Although I cannot speak for other "free loader" branches, I can set the record straight on the repeater system at Kordia's

Whakapunake site, built and maintained entirely by Gisborne Amateur Radio Club, Branch 11.

The letter by John ZL2TWS in the September/October *Break-In* talks of free loaders "parking" their repeaters at Kordia sites and refers to some as "lonely" non-National System repeaters as if they are somehow unworthy of existence. Well, let me say that Gisborne is a very lonely place and "lonely" repeaters can sometimes be the only means of communication with the outside world.

Recent increases in power charges by Kordia were the subject of a letter from the NZART President to Branch 11, explaining why NZART could not continue to pay the new charges for VHF repeaters located at Kordia sites. The National System repeater fees are presumably separately invoiced and I understand these will continue to be paid by NZART as they are there for use by all amateurs.

VHF repeaters are also available for use by all amateurs, although coverage is generally limited to the local district and hence get used more by local amateurs. The Branch 11 VHF repeater at Whakapunake forms a very important part of an emergency communications network, and Gisborne has made use of these in the past for exactly such purposes.

NZART has agreed to pay half of the new power charges (presumably as a bulk payment to Kordia on behalf of all branches using Kordia sites), with the branch compensating NZART for the other half. Gisborne Branch has a small membership and the new fees are equivalent to the subscriptions from five members, a goodly proportion of our membership. However, it is not unreasonable to expect a contribution from local branches.

Which brings me to my other point. The letter from the President contained the following statement: "If this invoice remains unpaid by 1 December 2019, Kordia will be advised to turn off your equipment and remove it from their site."

There are a number of things wrong with this statement. None of our equipment is inside the Kordia building and hence we do not occupy rack space and neither do we use their antenna mast. The repeaters are housed in a separate building, with its own antenna pole. Electric power is supplied from the Kordia building via an underground cable. This is the only Kordia facility we utilise, and even the power cable was installed and paid for by Branch 11.

The president's instruction in effect tells Kordia to illegally "break and enter" our building!

I note that we only ever received the President's letter and its attached invoice via regular mail. Had this mail got lost or delayed (this does happen on occasion) we would not have been aware of the deadlines for payment and hence in accordance

# Old Timers' Club

Ivan Horn ZL2ATU  
<otc@nzart.org.nz>



Hello 2020! A big "Hi" to the new decade. It only seems like a few months ago that we were anxious about the arrival of the year 2000. The scaremongering surrounding that arrival was something never to be forgotten. Insurance companies writing exceptions in policies and YK2 adds on TV and the world was supposed to end...Well, it didn't happen. We now enter 2020 which is the Chinese year of the Rat, so Happy New Year!

## A big welcome to two new members:

David Turner ZL3PO  
Ian Ramsay ZL1BYI

## Certificates issued to:

Trevor Brighting ZL2TN – 70 years  
Neil Prebble ZL1WX – 70 years

It was a pleasure to sign all of the above certificates.

I would like to publish a general statement regarding Silent Keys. I will not publish a members name who has become silent key unless

I have been furnished with a copy of the newspaper notice, a funeral service sheet or a letter from a family member. Also have it in your will to advise RSM and NZART HQ of you becoming a Silent Key, so your call-sign can be released! Don't be one of those 100 odd listed in the latest *Call Book* as Silent Key but still holding a call-sign – I'm sure that St Peter at the Pearly Gates doesn't need your call-sign to enter!

There has been no response regarding the vacancies which I wrote about a few months back that will be coming available at the next Annual General Meeting. The positions are that of

Grand Old Man, Secretary, Treasurer and Scribe. As it has been said a thousand times before, you only get out of a hobby just what you are prepared to put into it. So, any expressions of interest in the above positions can be directed thru me.

73 Ivan Horn ZL2ATU  
Grand Old Man

with the instruction, our equipment would have been removed from site before we knew anything about it.

On the face of it the statement circumvents normal disputes procedures, in addition to its rather threatening tone. Such hostile language has no place in an organisation whose members all have common aims, one of which is to preserve amateur radio for the future. I have to say that the President's letter has caused some ill feeling locally, especially among those members who have expended much effort in establishing and maintaining the repeater systems (both UHF and VHF) for the benefit of all amateurs. We need to encourage amateurs to join our ranks, not antagonise them and risk resignations.

This whole business could have been handled in a much more friendly and appropriate manner. NZART should be a harmonious organisation, not one riddled with conflict. Apart from our more serious emergency communications

aspect, we are after all just having a bit of fun!

73  
Con Wassilieff ZL2AFP  
Secretary Branch 11  
Gisborne Amateur Radio Club

I have covered off in previous columns in *Break-In* and the *Official Broadcast* all matters relating to the Kordia Agreement. Your branch should have been kept informed about these developments by your then local Councillor Phill Dodds ZL4XYZ (also a member of your branch) who was involved in the NZART decision making regarding Kordia power supply charging for VHF and National System Repeaters. As to the tone of my letter, I make no apologies as was it within normal commercial invoicing processes, where the invoice was sent and payment expected on the 20th of the month following. As NZART has a large invoice to pay I don't expect to have to chase branches for non-payment, expending time and money NZART can ill afford.

Mark Gooding ZL2UFI  
President

# District Plan Involvement Matters

Compiled by Douglas Birt ZL1BFS <lglo@nzart.org.nz>



## The times, they are a'changin'

On 28th November, Peter Mulhare ZL2IK (Northern District NZART Councillor) and I took part in an in-person hearing for the Whangarei District Plan Review. The overall plan review process has been rather a shock to us – it was far removed from a “normal” process, in which a Proposed Plan (or perhaps a Draft Plan) is published and members of the public file submissions supporting, or seeking changes to, specific aspects of the plan. Whangarei had embarked on a “Sectional Review”, in which only small parts of the plan are dealt with in any one period. If Amateur Radio Configurations are not mentioned in any of the “Sections”, which Sectional Review should we target for our submission? This had been a problem in Palmerston North some years ago, and in that process, we missed out entirely. We did not want to do that again.

## Evolutionary Changes in the Planning Process

The Resource Management Act 1991 specifies the legal steps a District MUST take in any District Plan review. This process was outlined in District Plan Involvement Matters in the January/February 2018 issue of *Break-In*. However, the sheer volume of submissions Councils receive, and the enormous magnitude of people and financial resources a council needs to expend to deal with these volumes, results in Councils looking for cheaper more efficient ways. If a Council can identify all the issues that are likely to arise in their Proposed District Plan, and provide solutions before the Plan is published, it can circumvent a large proportion of those costs. Consequently, Districts started publishing “Draft” district plans which do not have to adhere to the legal RMA process, then they adjust the proposed plan wording to coincide with the public feedback they had received.

Lately, however, Councils are starting the process even earlier.

a. Some Councils invite the public so put forward open-ended “Issues and Options”.

- b. Other Councils publish Objectives and Policies. If for instance, a Council has an “Objective” of having pristine residential streetscapes, and one of the “Policies” says “We will have no unsightly structures in residential back-yards” then Council could summarily throw out any submission requesting provision for Amateur Radio Configurations.
- c. Other Councils, like Whangarei, break their Plan Reviews into small more manageable chunks, and do a “Sectional Review”. This can be very fast and efficient, except that the submitter might not know which section applies to his/her issue.

## Whangarei changed everything

We first became aware of their plan review on seeing an ad for an urban and services review. On looking deeper, it was evident that they were doing a Sectional Review – and we had missed all the earlier sections. When we searched their website, there was very little information except for some philosophical intentions about how they were reviewing zoning, growth, relationships to services, but very little by way of concrete rules. A good place for submitters like NZART to start searching is the Definitions Section, but the Operative Plan had that section withdrawn, and we could find no links to the proposed definitions – we had to approach Council and we were given an (unpublished?) URL. Then we were alarmed to find that “buildings” excluded aerials, as these had been re-designated as “Major Structures” which had its own set of planning constraints. Under these constraints, all aerials had to fit within the zone height requirements (which is 8 metres in the residential zone) – meaning not even TV aerials on some houses can be placed above roof obstructions. The Ministry for the Environment had just published a set of recommendations on what should be included in District Plans, and Whangarei was implementing them.

## Update on recent LGLO activities as at 10 January 2020

### Whangarei Sectional Plan Review

Peter Mulhare ZL2IK, Dave McCluggage ZL1DMA and I had put in a very comprehensive submission (comprising Part A – what we specifically wanted, and Part B – comprehensive background about Amateur Radio) as outlined in the September/October 2018 *Break-In*. There was no opportunity for mediation, so two weeks before the Hearing on 28 November 2018 I put in an “Expert Witness Submission” concerning the need for height, and at the hearing Peter and I jointly presented a summarised statement of our requirement. The Hearings Panel comprised of independent commissioners who appeared to be very attentive to our requests, but we got the impression that the planners themselves were completely opposed to making specific provisions for amateur radio. We had covered the essentials the best we could, but when planners are opposed the outcome remains in the lap of the gods. We await with anticipation the outcome of the commissioners’ final decision.

### Waikato District Council

All of the “Submission Points” that we raised in our original submission on the Waikato District Plan have been assigned to their “Infrastructure” category, and this is scheduled for hearings in September 2020. There doesn’t yet seem to be a S.42A report, so we will have to wait to nearer the time before we can determine what action we need to take at those hearings.

### Waitomo

There is no further action we can take on the Waitomo Plan until we can see their actual documented Proposed Plan, which will be Notified on 1 May 2020.

### Marlborough

The Marlborough Council website reports that decisions on their numerous submissions are still

progressing. It is now four years since our initial submission was sent to Marlborough Council, and nearly three years since Branch 22 members attended the Hearings. We just have to wait until the decision version is published before we will know what further action is required.

### West Coast Combined District Plan

There is nothing new on the website.

### Waimakariri

The Proposed Plan is still scheduled for mid 2020.

### Waitaki District Plan

The Plan Review is still at Stage 2: “Public engagement on the range of issues facing the district”. The Council expects to release its Draft District Plan early in 2020.

### Timaru District Plan Review

Council is currently drafting its “Draft” District Plan, which is expected to be ready for consultation late in 2020.

### Porirua City Draft Plan

The full Draft Plan has now been published on their website. It has a very comprehensive treatment of Amateur radio – but it does limit EME dishes to 4 metres diameter on a 5 metre pedestal (probably copied from Auckland’s Plan). It would be worthwhile trying to adjust this to a 5 metre dish on a 4 metre pedestal (as in the Tauranga and Hamilton Plans). The Proposed District Plan will be released some time in 2020, and at that stage the LGLO will have further discussions with Titahi Bay Branch 42 people about a formal submission.

### Far North Draft District Plan

The Far North website reports that council is still at the “Research and Evidence Gathering” stage, and is doing the preparation for the launch of its Proposed District Plan.

Douglas Birt ZL1BFS

## Is your local District Plan under review?

Doug ZL1BFS <lglo@nzart.org.nz>

NZART’s Local Government Liaison Officer is available for assistance and advice.

Don’t be caught out when your local District Councils’ District Plan is up for review, keep Doug in the loop!

# Milestones

Craig Crawford ZL3TLB  
<milestones@nzart.org.nz>



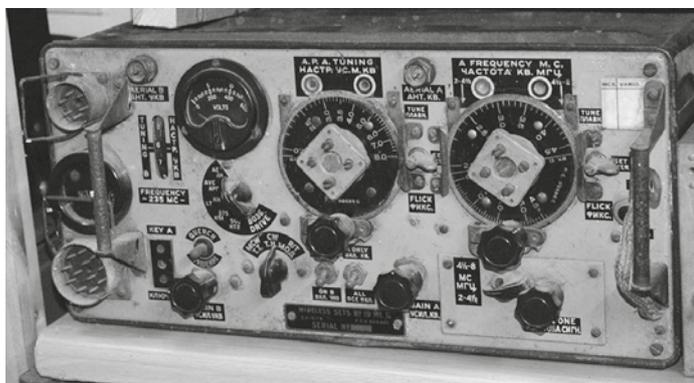
## Milestones of the venerable ZC1 transmitter/receiver

Many ZLs are operating seventy-five-year-old ZC1 sets, an amazing feat since their original design life was only eighteen months.

1938

- **NZ military and civilian radio experts travel to the UK to contribute to the development of a Commonwealth-standard military radio transmitter/receiver.**

The expert team included Angus Tait (later ZL3NL). They returned with the design of the No.19 set (WS19) originally manufactured by Pye UK. The No.19 set generated 2.5 Watts AM and 5 Watts CW on 2 to 8 MHz plus 0.4 Watts on VHF (235 MHz). When the NZ Army tried to order No.19 sets they faced a long delivery delay as the sets had already been ordered by the Canadians and Australians.



*No. 19 set.*

1939

- **A special committee is established by the NZ War Cabinet to design and construct war-effort radio equipment.**

The Post & Telegraph representative was Tom Clarkson ZL2AZ and the radio industry was represented by Ralph Slade. Their chosen ZC1 design has been credited to Percy Collier and Bill Fever of Collier and Beale Ltd. The receiver used 6U7Gs in the RF input, IF, buffer, audio output and BFO, with a 6K8G mixer and a 6Q7G for the detector and first audio stage. The transmitter used 6U7Gs for master oscillator, buffer and modulation amplifier, with 6V6GTs for power amplifier and modulator. The power supply used two 6X5GTs. This design provided up to up to 2.75 Watts of RF output over the frequency range of 2.6 to 6.5 MHz.

1942

- **An initial trial production of the ZC1 is constructed by Collier & Beale.**

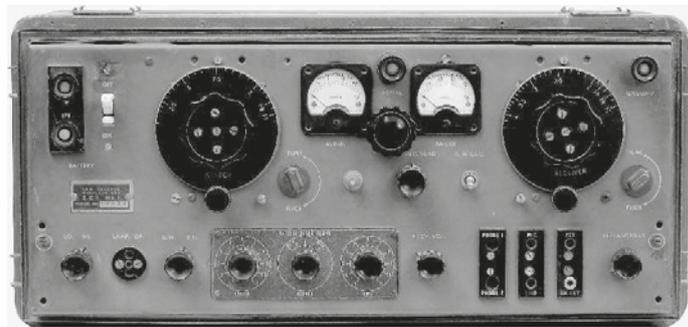
The ZC1 was officially designated the Transmitter / Receiver Type 4903HF. Only 165 of the proposed 1000 trial units were constructed as Collier & Beale were diverted to radar design and construction. Each set took 60 man-hours to manufacture.

- **Contracts for the construction of ZC1 Mark 1s are awarded to Radio (1936) Limited and Radio Corporation.**

Radio (1936) Ltd was in Quay Street, Auckland and their manufacturing was led by Jack Orbell ZL1AX (ex 3AA). Radio Corporation was located in Courtenay Place, Wellington. About 5000 Mark 1s were made in three versions. The latter versions included a Westclox clock mounted on the front panel, but these were quickly pilfered.

- **The Canadian Signals Engineering Establishment tests the ZC1.**

This was a requirement of the US lend-lease arrangement. They found the ZC1 to be superior to the No.19 set, particularly in weight (half), range (double) and ease-of-use (10 minutes of tuition compared to 4 hours).

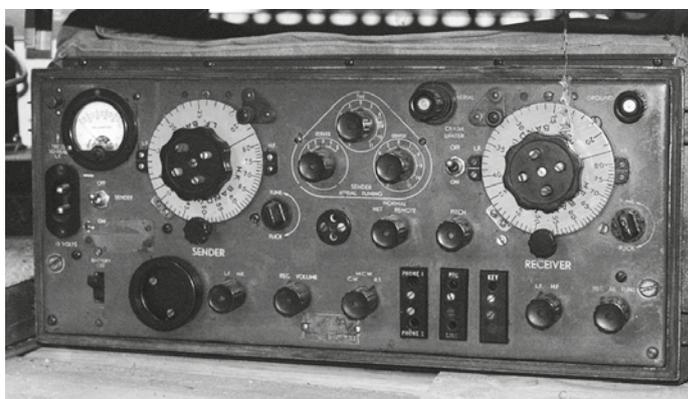


*ZC1 Mk1.*

1943

- **Construction of the ZC1 Mark 2 begins.**

The improved design, developed before the first of the production Mark 1 units had been completed, has been credited to Jack Orbell ZL1AX. The Mark 2 split an extended frequency range into two bands (2 to 4 and 4 to 8 MHz) and also replaced the 6X5s in the power supply with a synchronous vibrator. Originally FM modulation and UHF capability were to be added, but these requirements were dropped. About 9,600 Mk 2 units were made at a construction cost of £450 (\$900) each.



*ZC1 Mk2.*

A Mark 3 version was designed but did not reach prototype stage before the war threat ceased. Variations on the ZC1 design included the ZR1 receiver and the ZA1 50-Watt CW amplifier using two 807s. Only about twelve ZA1s were manufactured. In addition, a ZC8 back-mounted portable set was adapted from the 108 set, with about 100 being constructed.



*The ZC8.*

1946

- **Army surplus ZC1 sets and accessories are sold for £20 (\$40).**

These were offered for sale by the War Assets Realisation Board. The Transport Department purchased some units which were converted to crystal-controlled operation (3280 kHz) and mounted in the boot of traffic police vehicles. ZC1s were also widely used by the AREC and Search and Rescue groups (5680 & 3023 kHz).



*The full set of accessories.*

1947

- **The first article on modifications for the ZC1 appears in *Break-In*.**

Over 30 articles appeared between 1947 and 2009. In addition, Collier & Beale developed a modification kit for domestic use, with one band returned to the broadcast band and the other to the marine band.

# QRP

Wayne Jacobson ZL2OZ  
<qrp@nzart.org.nz>



Hi all QRP'ers. Welcome to a new column based around all things to do about and operating QRP. As a member of the New Zealand QRP Groups, we are into our third year and have slowly increased our numbers to 114, including some overseas members. If you would like to join us as a member or as a casual operator then contact me for further details to the email address above.

New Members: We welcome the following call-signs who have recently joined the group, Mark ZL3VML, Kevin ZL3ABY, Robin ZL4IG, Matt ZL4NVW, Jim ZL1LC and Dan VK4FHOY- who will be visiting ZL soon. We look forward to hearing you on air. Call on 3.690 MHz - there are often New Zealand QRP'ers members lurking around.

Our weekly Thursday Night Nets on 3.690 MHz at 8:30 pm NZDT are attended by an average of ten to fifteen members, and of recent months have been a real test of patience, equipment and antennae. With the solar cycle at its minimum and heavy QRN, there have been nights when QRP has been difficult. The odd member has resorted to QRO in order to get through the noise. For most though, QRP persistence has paid off, well done.

Our monthly GO QRP NIGHT (a fun and contest activity using QRP), has been well supported in spite of very trying conditions. We are currently undergoing a trial of a new points system in readiness for 2020, when both Phone and CW will be run. CW for the first hour, and Phone for the second hour. In order to increase contact numbers for our GO QRP NIGHT we have opened participation to all hams, but

request that if possible, you use 10 Watts or less. QRP members are out to make as many contacts as possible in the two one-hour periods. Each contact scores a point, NZART Branch numbers are multipliers. Those portable QRP members get a small portable bonus for going to the trouble.

Next year there will be some Awards on offer for those who enjoy Award hunting, like HOTA or 'Huts On The Air', and Offshore Islands Award.

As a columnist writer, getting copy for this column can be like pulling hen's teeth, but any contribution towards this column from members are always read with great interest. Like ZL2ATH's recent article about his hideaway in the Orongorongo Valley, and QRP operations from there. Plus Matt ZL4NVW's article on a QRP Expedition to back-country huts in Central Otago.

There are a mix of QRP rigs being used, with the µBITX (micro-Bitx) series proving very popular in the last year or two. The Yaesu FT-817 and FT-818 are also popular, with a smattering of other rigs like the Genesis series, one or two Homebrew rigs, K2 etc. Whilst our policy is 5 Watts for QRP, we allow 10 Watts for Home Stations, as this is as low as some equipment will go. Dipoles are still the most popular antenna for portable use, but there has been a swing to EFHW (End-Fed Half-Wave) antennae, being a single wire and feed, and in a portable situation, easy to erect. Long wire antennae also feature.

Please send any comments to the above email address.

73 and Good DX Wayne ZL2OZ



Matt ZL4NVW's Central Otago QRP Expedition to Kirtle Burn Hut.

# Youth Report

Xenia Berger ZL4YL  
youth@nzart.org.nz



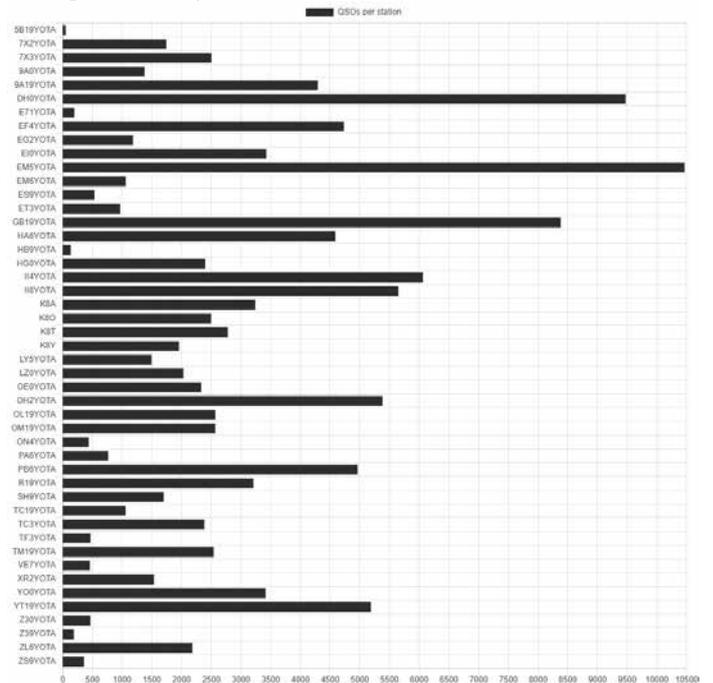
Youth activities in the past two months concentrated mainly on the YOTA Activity Month in December. This is an annual global event where young hams under the age of twenty five try to make as many contacts as possible during the entire month of December using a special call- sign. You can find more information at <<https://events.ham-yota.com/>>. We in New Zealand used the call ZL6YOTA - you may have worked us on the bands! This year we made 2183 QSO's on all Bands. The station with the most QSO's was EM5YOTA from the Ukraine, with 10500 contacts. Maybe that can be our aim for next year! However, only three stations had over 6500 contacts, so overall, we still did quite well.

Unfortunately, after a large initial excitement from youth in New Zealand about the event, we ended up only having four operators. Participants not only worked from

their own stations, but several also worked from ZM4T remotely. Our operators included Alec ZL1HAZ, Alex Wagner a visiting ham from Germany, Benjamin ZL2BCI and myself Xenia ZL4YL. During the event we had a lot more QSO's on FT8 than last year (2018), with the majority of our contacts being done through FT8. In the world, nearly a quarter of QSO's were done with FT8, about a third done with CW and the rest largely SSB.

It will be interesting to see how many more digital contacts are made this year (2020) during the month of December. I am expecting that since FT8 and FT4 have been steadily increasing in popularity since their beginning, that this form of contact will grow. Hopefully the number of participants in this event will increase just like them!

73 Xenia ZL4YL



# New on the Net

Jim Reed ZL1LC

<newonthenet@nzart.org.nz>



The New Zealand Government money gathering GST process for all major overseas transactions was activated on 1 December 2019. All major international selling web sites such as AliExpress, Amazon, Banggood and eBay are adding 15% GST to the total. With Banggood and eBay, they carry out the transaction and then at the final checkout process, tell you that they have added on 15% for GST. AliExpress does the same except it doesn't tell you that the additional cost is GST.

Do be aware, that if something doesn't arrive or doesn't work out, you will get a refund from the selling website, but excluding the GST according to the terms published on these websites, and good luck to you at getting that GST component out of the New Zealand Government coffers.

I haven't experienced any transaction over NZD\$400, which attracts more than \$50 GST and used to involve a full NZ Customs inspection, so don't know how that is going to work out. I suggest, that if you buy something of this value via eBay etc, that you keep all your records so that you can easily prove that you have already paid GST on the purchase price and shipping. If some one has experienced this higher value process personally, please email me so that we can inform the rest of the ham community.

There are still smaller vendors that are sliding through the net, if you buy something under NZD\$400, and have it shipped directly to you. However if you ship via NZ Post's YouShop, they will charge you 15% GST on the purchase price and shipping, which is going to make them less competitive when they are compared with someone shipping directly to you.

Regardless of the additional cost, if the item is not available here or the local price is exorbitant, as many of the local electronic parts are when compared with direct overseas purchase for the same item, then the GST surcharge is not going to slow your overseas purchases down.

Lots of people use Ham Radio

Deluxe. The old free version 5 can still be found on the web but version 6 requires payment. They recently released a significant upgrade to version 6 for those who have paid their subscription. There was a huge reaction from the user community and within two days after the release, HRD were apologising for all the errors in their software and the items that were missing. Now they have released a Public Beta version, and may have released a "fixed" version by the time you read this, so check their website. <www.HamRadioDeluxe.com>

eQSL <eqsl.net> upgraded its application (now version 4 they say) website and server and it now works okay. It could be faster but at least now there are no overload messages coming every second time you access it.

eHam <eham.net/reviews> have changed their summary web pages. You used to be able to see the number of reviews and the average rating. You now need to go to the actual product page to see the stars that a product has been awarded and then plug your way through the reviews. It's all based on the PC premise "If you can't convince them, confuse them." That's progress for you.

Teamviewer, <teamviewer.com> a remote-control program for PCs, has been used by hams for remote controlling a PC which is used in a remote station especially for the digital modes. If you are using FT4 or FT8, this generates loads of traffic. Teamviewer are treating such use as commercial rather than personal use and at over USD\$500 per year, this makes it unaffordable for amateur use. A more affordable solution is Splashtop <splashtop.com> at USD\$60 per year and that also works on iOS and Android devices. Apparently Microsoft Remote Desktop works too, but not from one of my favourite software vendors.

West Mountain Radio <westmountainradio.com> has announced a new RIGrunner which works over the internet. RIGrunners distribute DC power for ham radio installations. Search their page for the

4005i, a device which allows you to monitor and control up to five DC connections. This would be ideal for repeaters or remote station operations. The tricky bit is the current/voltage monitoring as some cheap eBay products can handle remote switching.

Some hams use LiPo batteries for portable power. Here are a few things not to do things not to do <tinyurl.com/ZL1LC2002>

If you have a dead LiPo or Lithium Ion cell, not a whole battery, which won't charge, here's a quick fix to get it to get it charging <tinyurl.com/ZL1LC2003>. Just make sure you don't do this for more than thirty seconds and that the battery does not get too hot to handle. If you have a whole battery that has one or more dead cells, disassemble it and activate the cells one by one.

And here's a LiPo battery checker and cell balancer with a model number of XBC100. <tinyurl.com/ZL1LC2004>. If you don't have a fancy checker like this, at least always use a cheap LiPo Battery Alarm (less than USD\$3), on the balance port, from <ebay.com> which will alert you when a cell voltage falls too low.

Field Day is coming along soon and I found some heat shrink, no soldering, cable joiners that could be handy for your bag. They are waterproof which is also handy for any Field Day

< tinyurl.com/ZL1LC2005>.

Also, here is a little transceiver for the field day. Look at <tinyurl.com/ZL1LC2006>. There's a single band one with a display for USD\$190 and a 10-band unit is USD\$350. On SSB the audio from one of the single banders is brilliant. Wayne ZL2OZ, who runs the QRP Net

(and now writes the QRP Column for *Break-In*) at 8:30 pm Thursdays on 3690 kHz, runs it on a couple of 18650 LiPo batteries and says it only uses 700 mA on transmit for 3 W TX. Don't know what the receive current is.

We all use cable ties to some degree, but I bet you have never thought of most of these ideas for keeping your shack tidy <tinyurl.com/ZL1LC2001>.

I tried the new version of JS8, the digital conversational mode that is based around FT8. It's come a long way from the prerelease versions that were around in early 2019 and looks quite useable. The problem is that I never found anyone to talk to on this mode. Version 2.0.X is available from <js8.call.com>. Be aware that it comes up as an insecure website, which means they need to do a bit more work on it.

Peter from up north has sent in a couple of his favourites. Coax and line loss calculator <tinyurl.com/ZL1LC2007> and for all your engineering calculations etc, go to <engineeringtoolbox.com>.

Raspberry Pi's have an attraction for some people and can be used for many things. Here's a video that shows its use for QRP Data <tinyurl.com/ZL1LC2008>.

Listen to podcast <QSOtoday.com> Episode 274 and hear ZL3DW tell his story.

And now for a bit of history. A look at the History of Metrics <tinyurl.com/ZL1LC2009>.

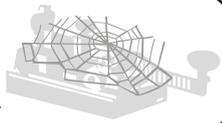
I'm always looking for sites to present, so if you have a couple of good ham radio sites in your bookmarks please email them to me at <newonthenet@nzart.org.nz>

Jim ZL1LC

NZART Official Broadcast  
is on 3.900 MHz USB at 8pm on  
the last Sunday of the month.  
It is also available on the  
National System.

# Silent Keys

The Association deeply regrets to record the death of the following members and extends its sympathy to the bereaved.



## Silent Keys: guidelines to contributors

Contributors are requested to limit their obituaries to between 200-400 words. Content should focus mainly on the amateur radio activities of the deceased. Normally photographs cannot be included.

### Ralph Boshier ZL4AG

Ralph sadly became a silent key on 4 December 2019 in North Shore Hospital, Auckland. Born 2 October 1933 in Feilding, his parents were farmers and Ralph was expected to do his share of the farming duties. He soon found that these were not to his liking! While at school his interests were in the sciences and this led to him attending Wanganui Technical College where two of the senior masters were radio amateurs. This early exposure to radio and electronics resulted in Ralph getting himself a job with the New Zealand Post Office as a Junior Technician in Wellington at the Radio Depot.

In 1953 he was called up for Compulsory Military Training and served for a time with the Royal New Zealand Air Force as a Radio Technician. A bad burn to one hand saw him in hospital and it was during this time that he met Rosemary who was working as a Nurse and was to become his wife.

After completion of Compulsory Military Training Ralph was based in Wellington at the Radio Depot, followed by time at Makara Radio Receiving Station and at Himatangi at the HF radio transmitting site. He sat and passed his amateur licence exam on 29 November 1951 and was issued the call-sign ZL2APB.

In March 1966 Rosemary and Ralph shifted to Dunedin where he was appointed to the position of Chief Radio Technician at the Post Office Radio Depot. Ralph was well regarded and one of his fellow workers at the time described him as a "technically competent hands-on boss who treated all staff with the utmost respect and took a personal interest in their welfare both on and off the job. His integrity was second to none". He was allocated the call-sign of ZL4AG and also joined the Otago Amateur Radio Club. Branch 30 of NZART. Ralph also held the call-sign VK3DHD which he used for portable operation in Victoria Australia for a short period in 1981.

In August 1984 the Boshier family moved to Auckland and a promotion to Chief Technician at the Post Office Radio Depot in Auckland, in charge of over sixty staff. This role also included an oversight of the Musick Point Maritime Coast Station which is now home to the Musick Point Radio Group, Branch 80 NZART.

In September 1988 the New Zealand Post Office engineering services became Telecom New Zealand. Despite some thirty nine years of service, Ralph faced early retirement when the position of Chief Radio Technician was abolished. He soon found a position at the Dockyard in Devonport in the Calibration Laboratory and his technical skills were in demand producing and cataloguing documentation relating to Navy test equipment. After his contract with the Navy finished, his skills continued to be in demand, this time at Birkenhead College where he joined the staff as their AV Technician.

Finally, in 1995 came retirement, leaving more time for his amateur radio activities. With the move to Auckland he was able to retain his ZL4AG call-sign and his amateur radio activities were mainly on the HF bands in SSB mode as well as VHF activity from home and mobile. He was an active member of the Vintage Radio Society and was also a member of the Old Timers Club (OTC). He kept in touch with many of his contemporaries by means of their twice weekly Techs Group, comprised of ex Post Office Radio Section employees. Despite failing health, he kept up his many radio contacts until he had to go into hospital.

A long time supporter of the North Shore Amateur Radio Club both he and Rosemary regularly attended the monthly meetings. In June 2004 Rosemary and Ralph were appointed Examination Supervisors on behalf of the New Zealand Association of Radio Transmitters (NZART)

# Engineering and Licensing Group

<elg@nzart.org.nz>



Warren Harris ZL2AJ has applied for a APRS repeater at Topo50 Takauranga BD36 583.03 464.00. The transmit frequency will be 144.575 MHz TX. (External ARC152)

Raglan Branch 83 has applied for a voice, data & digital repeater at Topo50 BD33 009.23 112.62 Glenview, Hamilton. The transmit frequency will be 439.450 MHz. (External ARE038)

Hawkes Bay ARC has applied for a DMR repeater at Mt Threave, Topo50 BK 241.57 930.08. The transmit frequency will be 439.2375 MHz.

The licence for the existing inverted repeater on 434.000 MHz transmit at Mt Threave has been cancelled recently which allows this to work.

Please send applications for ELG to engineer to <elg@nzart.org.nz>.

Applications for licences to be engineered by ELG should only be sent to <elg@nzart.org.nz> and not to individual ELG team members. Steve Fogerty ZL2ASF – ELG Team Leader – Ph 03 528 9366 (home) Ph 03 528 8707 (work) or Ph 021 050 4054 (mobile).

## Te Puke Amateur Radio Club Inc. Branch 53 of NZART

### Market Day

Saturday 28 March 2020

Paengaroa Community Hall, Old Coach Road,  
Paengaroa. 3189

Open 06:30 am - Sale at 10:00 am  
\$20.00 Per Table or \$25.00 on the day  
\$12.00 For Half a Table or \$15.00 on the day

As Always Plenty of Good Tucker and  
All Day Breakfasts from 07:30 am.

Motorhome Parking Available

If you get lost tune into 147.175 or D-STAR 145.725

For Further Information and Table Bookings

Ph. (027) 248-8664 or (07) 533-1029

Email: <sydrowe@xtra.co.nz>

and were authorised to conduct the amateur radio examinations. They both did a marvellous job of this, giving up their Sunday afternoons to come to the clubrooms when we conducted the training courses and also making their home available for individuals who wanted to sit the exam. To date, Rosemary and Ralph with a little help have been instrumental in getting over 150 people through the exam and able to join the ranks of amateur radio operators.

In recognition of their contributions to the North Shore Amateur Radio Club and in particular their work with the examinations, Ralph and Rosemary were made Life Members

of the North Shore Amateur Radio Club at the Clubs Annual General Meeting in November 2019.

Rosemary ZL1RO has had a long association with the New Zealand Women's Amateur Radio Organisation (WARO) and Ralph was pleased to support Rosemary in her various roles within that organisation.

Ralph's interests were not confined to radio and technology. He also had a keen interest in photography and music. Ralph is survived by his wife Rosemary ZL1RO, sons Malcolm, Bryan and Stephen ZL1SWB and their families.

Rest in peace Ralph, we are all the poorer for your passing.

Vaughan Henderson ZL1VH

# WARO – nz womens amateur radio operators

with Cathy ZL2ADK and Ngaire ZL2UJT  
<waro@nzart.org.nz>



## Hi from Taranaki

Hope you all had a wonderful Christmas and New Year with family and friends.

Well this will be my last contribution to *Break-In*. It's been a little like having a big family as I have been sharing with you many of my activities over the years, and in turn of course I get to hear about yours. Sadly I need to step down as I have been told to reduce my work load due to health problems, and hopefully someone will step up and take this column on.

*It would be sad to see it fold after so many years so please think about taking this on.*

I'm not sure about you all out there, but since I retired I have never been so busy. The fact I have joined many clubs and organisations doesn't help. Amateur radio has been a part of my life for many years now and I really enjoy the friendships made. A plus is to enjoy our local Branch 27 Club activities. I'm also involved with a Lodge, working as a Volunteer for DOC doing Lizard education to groups and various other activities as the Taranaki Representative for New Zealand Herpetological society (Lizards). With an interest in Genealogy, plus family commitments, hence the reason I have been told to cut down.

I have stepped down from running the Taranaki Award after many years with two of our Club members have stepped up and offered to take it on. Thank you to Jono ZL2JBK and Doug ZL3DUG.

Have just had our daughter and partner from Kumara on the West Coast come to stay for a week for a catch-up and to see our new home. It was just so good to spend time with her and two of our other children who are able to come over, spending some real quality time together.

Have had a couple of visits to A&E over the past few weeks and have seen it all. I really feel for our Paramedics with the abuse and violence they are subjected to. I think I would have been safer to stay at home with some of the characters who came in, some escorted by the

Police. Radio wise I enjoyed doing the Taranaki Award and am so grateful to our Taranaki members who come on the air in support of the Award each year.

*Ngaire ZL2UJT*

My thanks to everyone who participated in the Taranaki Award

## Taranaki Award Results

Dan Wilkinson shield

1st David ZL1DK

2nd Don ZL2LXD

3rd Colin ZL2FC

Top Taranaki scores were

1st ZL2JBK

2nd ZL2RPW

3rd equal ZL3DUG & ZL2ME

## From the Manawatu

Well hello from the Manawatu where we are still waiting for summer to arrive, but hopefully when you read this column things will have improved. Between rain, wind, Doctors appointments etc there seems to have never been a dull moment.

It started off with a rushed overnight trip to Waitara in the Taranaki to attend a relative's very significant birthday. This was followed the next weekend by a commitment in Woodville over Labour Weekend. We rarely travel over to the East Coast these days, not because we don't want to but without the Manawatu Gorge Road we try to avoid all the idiots that seem to enjoy trying to get over the Saddle Road as fast as they can. The alternate route, which we prefer, is less busy but quite narrow in parts, the Pahiatua Track. In our big van we must allow that little extra width. Finally got home from that on the Monday then the following weekend the OM was tied up with other "Self Containment Officers" (for motor homes silly, not people!) doing their four yearly check-ups at the VTNZ in Palmerston North.

Still the calendar continued to fill up, with the following weekend attending a three-day SAREX combined with the Whanganui and Taranaki based in Waverley. Then came Cross Hills way up in the Kimbolton Area. A lovely drive up to attend to the parking of motor

homes for their huge Garden Fair they have up there each year. We enjoy that job because we meet so many new people who are travelling New Zealand some to see gardens, some with just an interest and a lot just looking for something different to attend. The weather was 50/50 but being so high up there we certainly copped the wind.

We still have three Christmas activities to attend, followed by our Branch 23 barbecue in January, and the combined Branches picnic in Ashhurst on the 6 February 2020. "Take it easy, slow down!" say my Doctors but I hate breaking commitments made a long time ago.

As a result of all this, and on top of that Ngaire ZL2UJT being given the same message, we are now looking for a WARO *Break-In* Columnist(s). It seems the workload is falling on fewer and fewer members although our membership is quite steady. Most of us (not meaning you Topsy!!!!) are not getting any younger and have more than done our share over the years. It's now up to someone else to step up or this column will be lost. It only needs to be written once every two months and usually takes about an hour of my time, although I know Ngaire spends more time than that. Topsy ZL2LS wants to get swamped with volunteer options.

All the best to you all.

*Cathy ZL2ADK*

## Brief Outline of the Whanganui/Taranaki SAREX.

Well it started out well. There was Jill ZL2DBO, Cathy ZL2ADK, Brian ZL2ADL and Bruce ZL3BN as well as technical help from Graham ZL2GX from Palmerston North. We knew Coms was going to be a challenge from Waverley as the Search Parties were going at least another 30 kilometres away and

into some rugged country. Graham is very knowledgeable and has a lot of equipment that a lot of us don't have access to. As he was mobile he was able to set up a good system with the help of our SAR repeaters and setting himself up as an advance party. It was a challenging SAREX to say the least. I will write a full report for the next WARO Bulletin but it wasn't helped by the weather turning really bad and struggling all day Sunday up till about 5.30 pm to try and extract our ten search parties cut off by bad weather. The Airforce NH90 hung around all day waiting for very small breaks in the weather to retrieve them all. It was an excellent exercise all around though and a lot was learnt by all.

What was nicest was to have Jill and I side by side doing what a few years would have been considered very odd, two YLs taking their shifts together to run a search. We had some great comments from the Police and from the Search Parties as they came on. "Great Coms ladies!" Still we weren't surprised, why were they? Both of us can be quite satisfied that we now have quite a handle on SAR Tracks, and can appreciate its effectiveness.

Thanks Jill for all the giggles in the off times.

*Cathy ZL2ADK*

## NZART CONFERENCE 2020

Come and join us in the beautiful West Coast at Greymouth 30 May – 1 June 2020.

Shantytown is a fascinating place, and so many things to enjoy. Stay at the lovely Kingsgate Hotel and enjoy West Coast Hospitality. Book Now!

Wishing you all the very best from us both.

Please try and keep this page alive.

*Ngaire ZL2UJT and*

*Cathy ZL2ADK*



*Cathy ZL2ADK & Jill ZL2DBO at the Whanganui/Taranaki SAREX.*

# Awards

Awards Manager: Andrew Barron ZL3DW  
<awards@nzart.org.nz>



Congratulations to Rick Jackson ZL3RIK for achieving the Worked all Pacific (WAP) Award and to Michael Sheffield ZL1ABS for achieving the Worked all New Zealand (WAZL) Award. WAP requires contacts with thirty Oceania countries (DXCC entities) and WAZL needs contacts with forty-five different NZART branches.

Many New Zealand hams regularly use the call-sign lookup function on <qrz.com>. It is probably the most up to date worldwide database of amateur radio call-signs. Unless you are very recently licensed, you will find some information about your call-sign even if you have never updated or loaded any details onto the website. Enter your call-sign into the text box at the top left of the webpage and click Search. If you use the HF bands for international contacts, it is a very good idea to add more information to the webpage. It is easy. At least update the QSL information. You can state whether you will respond to QSL cards received direct or via the bureau. You can also state whether you use LoTW (Logbook of the World) and/or eQSL. It is worthwhile checking the site when you send out QSL cards. There is no point sending expensive

cards to stations that don't want them and won't send you a card in return. Lookup ZL3DW on <qrz.com> to see the information that is provided. You need to create a 'login' if you want to edit your individual webpage or to view the full station details, including the operator's email address.

<qrz.com> also runs a series of seven free awards, with many endorsements, and it has its own QSO logging system. I know that the last thing most of us need is yet another online log, after uploading to LoTW and possibly ClubLog, but the upload is easy, and necessary if you want to apply for the QRZ awards. You can upload an ADIF file, or download the log directly from your LoTW log, which has the benefit of including all of your LoTW QSO confirmations. If you end up using QRZ as your main station log, you can send QSO's from QRZ direct to LoTW without having to take the additional steps of exporting the ADIF, signing with TQSL, then uploading to LoTW. Confirmation of QSO's is done automatically if the contact appears in another station's QRZ log, or you can select individual QSO's and send an automated request for confirmation, or you can



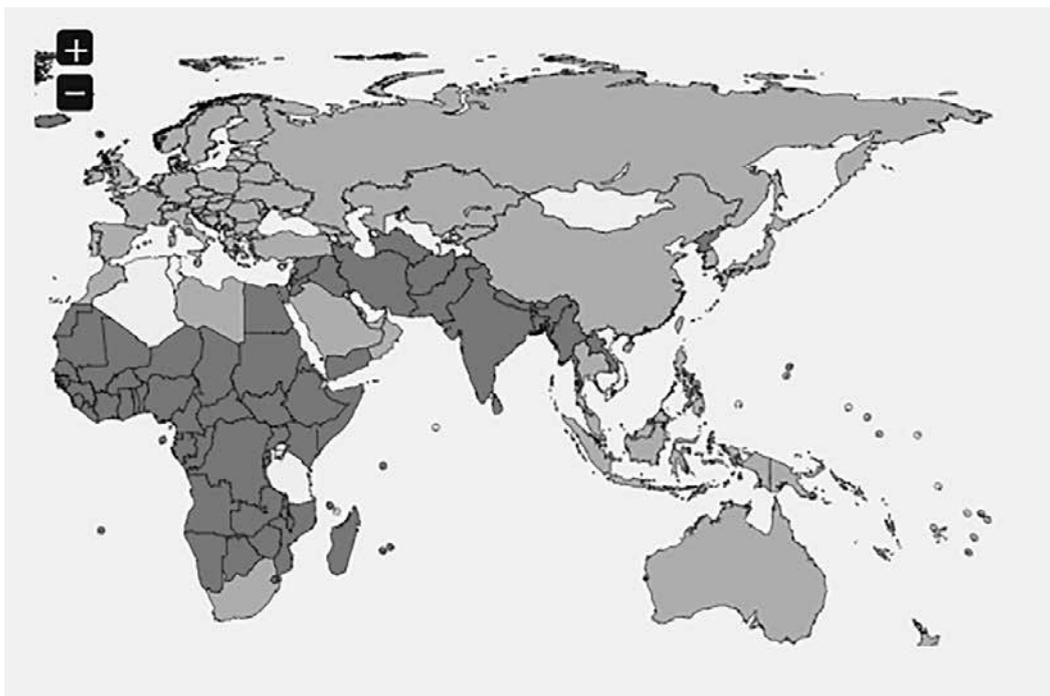
*DX World Award, showing confirmed, worked and, not worked countries.*

download an update from LoTW. As far as I know, you cannot use QSL card confirmations unless they have been approved via LoTW. The log format is actually quite good with search/filter options plus little national flag icons and usually, the operator's full name displayed. When I say free there is a catch! After you apply for an award and it has been issued, a small logo appears on your <qrz.com> web page, so anyone looking up your call-sign will see what a cool operator you are. You can order printed copies of the award certificates, but they are pretty expensive at USD\$24.95 each. You cannot print your own award certificates.

All of the awards can be endorsed for bands and modes, (mixed, phone, digital or CW). The calculation is done automatically, no manual sheets or data entry is required.

The '50 United States Award' is the QRZ equivalent of WAS (Worked All States). I am still two states away from achieving that one. The 'DX World Award' is the QRZ equivalent of DXCC. It is awarded for confirming contacts with 100 DXCC entities, commonly referred to as 'DXCC countries.' The 'World Continents Award' is equivalent to WAC (Worked All Continents). The 'Grid Squared Award' is for confirmation of 100 Maidenhead Grid Squares, so it is one of the easiest awards to achieve. The 'US States Counties Award' is easier than the CQ CA award as you only need 100 counties for the basic award. The minimum requirement for the CQ CA award is 500 counties. The newest award is the 'Master of Radio Communication - Europe' award for confirmed contacts with the sixty seven European countries. There are plans to extend this award to other regions, so there may be an Oceania one in the future. Finally, there is the 'World Radio Friendship' "warm fuzzies" Award. It is very easy to achieve as you only need twenty five confirmed contacts from anywhere. It is sort of equivalent to the World Prefix Award because the call-sign of each of the contacts must begin with a different prefix.

The fee for all NZART Awards except honour plaques is now NZD\$5.00 for ZLs and \$6.00 USD, AUD, or UKP for DX stations. Cheques, Credit Cards, IRCs, and postage stamps are no longer accepted. You can apply for awards by email to <awards@nzart.org.nz> and pay via PayPal to the same email address. Or you can post award applications to The NZART Awards Manager, PO Box 1733, Christchurch 8140, New Zealand.



*The seven QRZ awards.*

# HAMADS



**FOR SALE:** Bencher Key + K 10 Key, MFJ-941E Tuner, Kenwood 200 Tuner, Atten 200 Watt dummy load. Open to offers. Contact Kel Telephone (027) 494-6317 or (09) 433-9757.

**FOR SALE:** Yaesu FT-7800R Dual Band FM transceiver, complete with YSK-7800 separate face plate mounting kit and connecting cable, operating manual, original packaging, power cable and speaker all you need for mobile. \$320-00. Also Diawa LA 2035R 30 Watt 2 metre linear. \$55-00. Contact Barrie ZL1BEL on E-mail <kauricottage@gmail.com> or Telephone (021) 237-4898.

**FOR SALE:** GS-050 Thrust Bearing for Yaesu rotator. New in original box. Offers pleas. Contact Russell ZL1RWR. Telephone (029) 850-9097.

**WANTED:** A home-brew SSB transmitter of the early 1950s. For a museum display commemorating

the 1951 QSO between ZL1AU and (??) ZL1LZ. Operational status immaterial. Contact Alan ZL1AUW. Telephone (09) 444-2423 or E-mail <z1lauw@nzart.org.nz>.

**WANTED:** Collins 30J transmitter parts. Modulator chassis complete 9RD-7 or a 100 to 250 W modulation transformer. Contact Steven ZL2UV. Telephone (06) 759- 444 or E-mail <steven.prout@gmail.com>.

**WANTED: RADIO VALVES: CASH PAID FOR ESTATE LOTS OF OLD VALVES AND OLD HAM RADIO VALVE COLLECTIONS.** Telephone Paul (09) 528-2022 or E-mail <paul.ssegrub01@gmail.com>.

**WANTED:** World War One military radio or telephone equipment or parts thereof. Contact Ross Jowitt ZL1UND. Telephone (09) 236-3761 evenings or (027) 492-0048 or E-mail <rossjowitt@xtra.co.nz>.

## Te Puke Amateur Radio Club Inc. Branch 53 of NZART

### Market Day Saturday 28 March 2020

Paengaroa Community Hall, Old Coach Road,  
Paengaroa. 3189

Open 06:30 am - Sale at 10:00 am  
\$20.00 Per Table or \$25.00 on the day  
\$12.00 For Half a Table or \$15.00 on the day

As Always Plenty of Good Tucker and  
All Day Breakfasts from 07:30 am.

Motorhome Parking Available

If you get lost tune into 147.175 or D-STAR 145.725

For Further Information and Table Bookings  
Ph. (027) 248-8664 or (07) 533-1029  
Email: <sydrowe@xtra.co.nz>

#### Answers ZL Crossword 45 from page 28

**Across:** 1 Field Day, 7 TA, 9 QE, 10 analog, 11 UA, 12 own, 13 WO, 14 quad, 15 keying, 17 ewe, 18 eyes, 20 eroded, 24 ute, 25 callbook, 29 IRA, 30 stie, 32 cowls, 33 Orc, 34 speak, 36 brat 37 or, 38 co, 39 to, 40 ads, 41 pad, 42 water.

**Down:** 1 frequencies, 2 equate, 3 lead, 4 diodes, 5 yankee, 6 wary, 7 town, 8 agog, 16 inductor, 19 sol, 21 et, 22 detector, 23 forward, 26 AR, 27 layers, 28 backup, 31 irate, 35 pod, 36 boa, 38 CW.

## Advertising in *Break-In*

### 1 Hamads

Hamads up to 50 words are now free as a service to members but the following conditions will apply:

A single, free Hamad in each issue of *Break-In* is only available to financial members and Branches of NZART buying or selling personal equipment. Members and Branches wishing to use this service must include their NZART Membership Number or other evidence of membership.

Each free Hamad is limited to 50 words; any extra words will be charged at the current rate of 25c per word, telephone and fax numbers count as two words each, e-mail addresses and *Call Book* address as three words each. All prices include GST.

For further details view <<http://www.nzart.org.nz/h-quarter/break-in/advertising-in-break-in/>>.

Please send to Email: <hamads@nzart.org.nz>.

### 2 Classified Advertisements

### 3 Display style adverts

### 4 Commercial Advertising

For further details view <<http://www.nzart.org.nz/h-quarter/break-in/advertising-in-break-in/>>.

Please contact the Advertising manager.

E-mail: <advertmanager@nzart.org.nz>.

*The Editor and NZART Inc reserve the right to discontinue or decline any advertisement.*

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# NZART CONFERENCE 2020

WESTCOAST | NZ | 30 - 1 JUNE 2020



The organising committee for the NZART Conference 2020, invites you all to join us at Shantytown on the West Coast of the South Island, Saturday 30 May – Sunday 31 May 2020. For either the full amateur programme or the full alternative programme the cost is \$220.00 per attendee. While this cost is more than the usual registration fee we have tried to keep it as low as possible while including FREE access to Shantytown.

NOTE: Those with motorhomes cannot park at the Conference venue of Shantytown overnight, and will need to make alternative arrangements for their vehicles.

A new website has been developed and is now online at:

**<[www.nzart-conference.nz](http://www.nzart-conference.nz)>**

The website contains the most up to date information about the conference and should be your first place to look. Updates to the page will be made from time to time, as information is available or confirmations are made.

As of 1 January 2020, a Conference newsletter with updates will come out every three weeks with additional information. You can sign up to receive this via email as it comes out, or download the current or past issues of the newsletter from the website.



Also available on the website are email address contacts for the Alternative Programme, the Sunday Forums and Conference Registration. These should be your first point of contact for any Conference information.

The Conference Registration Form is available for download from the website.

The Alternative Programme will leave on both days from and return to Shantytown. It is up to those attending the Conference or the Alternative Programme to make their own arrangements for travel to and from Shantytown.

Conference Committee 2020

# NZART CONFERENCE 2020

WEST COAST | NZ | 30 - 1 JUNE 2020



## NZART Conference 2020 Alternative Programme

The 2020 alternative programme will be based in Shanty Town along with the main Conference events, meals and functions.

We've planned a two-day programme including:

- all important time to catch up
- a chance to get to see what life was like in the Gold Rush era
- free time for shopping in Greymouth and Hokitika with their wonderfully unique blend of shops and wares
- a chance to make something to take home
- visits to craftspeople and artisans
- a chance to wonder at the region's historical sites
- see Greenstone carving and glass-blowing first hand
- come face-to-face with amazing local wildlife
- see World famous natural wonders

To keep up to date with Conference information visit the website at [www.nzart-conference.nz](http://www.nzart-conference.nz)

\*\*The final timetable will depend on registrations and may alter.

