



GATEWAY

**The Official Magazine of the Gippsland
Gate Radio & Electronics Club Inc.**

September 2019



**Amateur Radio in Anime
Avoid Being Slugged
Phones & the NBN
And More**

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Note: - club meeting minutes are on the club website

Event Queue

September:

20th General meeting – Guide hall

October:

4th Prac night – in the club rooms
13th Yarra Valley Amateur Group HamFest (courtesy WIA)
18th General meeting – Guide hall
19-20th JOTA 2019 (courtesy WIA)
27th Ballarat Amateur Radio Group, BARG Hamvention (courtesy WIA)

November:

23-24th Spring VHF-UHF field day

The GGREC is planning to hold some Club Events. These are the Summer Field Day, the John Moyle Memorial Event and possibly the Winter Field Day. Dates will be forwarded at a later date. The Clubs participation in these events means that, besides having fun in setting up and operating our gear, we also promote our club. Furthermore the club is equipped with a complete set of portable gear. Why not use it? Please consider to be part of these events. The Committee of the GGREC

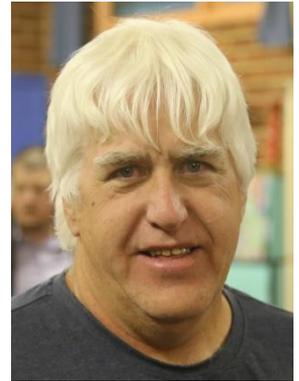
President's Report - Tony Doyle VK3QX

Hi Members,

Another month has passed, and we are now only about three months out from Christmas again. It seems like each year gets shorter.

Prac Night this month saw Rob (VK3BRS) tuning the new diplexer, which was timely as the new RGW frequencies have now been issued, without amendment, by ACMA. Now that the frequencies have been confirmed and assigned, we can start planning the next phase of the project.

If we leave the IRLP node in place, we will need to order new crystals and wait for them to arrive or forego the IRLP node for the time being. We couldn't have pre-empted this as there were no guarantees we would get the recommended frequencies. However, the committee are instead proposing to relocate the IRLP node to the club rooms and direct connect it to the RGW repeater, thus alleviating the need for the node radios and new crystals. This will also provide much easier access for maintenance and resolve the current audio issues. Hopefully, you will have seen the business plan for the club internet connection that will facilitate this plan, for discussion at the GM. This can happen relatively quickly if everyone is happy with the proposal.



Now that the weather is improving, we can start to make some plans for the RGW antenna maintenance. We plan to run a working bee (and BBQ) to check the antenna and feeder cable and do some spring grounds maintenance around the club rooms. Please give some thought as to whether you can help with this as we will be asking for suggestions on dates this GM.

Saturday October 19th is the date for the JOTA event for our local Girl Guides group.

If you would like to assist, it will require a Working with Children card. I did mine a couple of weeks ago and found it was a relatively easy and free process, an online form and photo at the post office, and it only took a couple of weeks for the card to arrive. There is still enough time.

Bruno (VK3BFT) will give a briefing at the GM on the activities we did last year so that we can prepare a program for the day and the equipment.

At this month's GM we can also look forward to Michael (VK3GHM) doing a talk and showing some photos of his participation in the Kidney Kar Rally in August.

It promises to be a very busy time over the coming weeks.

See you at the GM on Friday 20th of September

73

Tony Doyle
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From The Editor



Time for some 'Why would you bother' type repairs. A bloke from church brought around a combination amplifier & radio, or as they have come to be called, a "Receiver". In the current era of Bluetooth audio and smart speakers, quite a lot of what we once regarded as everyday Hi-Fi speak has been lost. I tend to think a lot of the newer generation look at this older gear, then realise they can't talk to it with their phone etc. and just give up and toss it out. A while ago I ran across someone trying to unload an open-reel tape recorder, he had almost no idea about it what so ever. I can't remember his exact words now, but at the time he made me laugh.

Anyway, this one was passed my way in need of a new power lead, someone had cut it off close to the back panel. Considering the condition of the case, it was probably obtained from the last council hard rubbish run.

I gave it a quick clean, then whipped off the lid – Yikes, did the swap people once live in hear? There was enough crud on the board that some of the lower lying components, like resistors etc., were totally covered and no longer visible.

So I did something I usually avoid, I propped it up against my fence, with the lid off, 'and let it have it' with the garden hose. Afterwards I hung it from the cloths line using a hanging basket hook – as you can see in the picture here.

After an hour or two in the sun, I finished it off with a good dose of compressed air, not to dry it out – the sun had done that, but to get rid of some extra muck the hose missed.

The owner had supplied a spare power cord, unfortunately it was only two core, so I donated a more proper three core lead, soldered it in then gingerly turned it on. I had given it some basic tests with my multimeter, so I knew its earth was good etc., but I was a bit dubious about the insulation in the power transformer. I was somewhat selective earlier on with the garden hose trying not to overly blast the transformer. Then there is also the worry about leakage paths on the circuit boards that could easily drive the output devices into full conduction, generating lots of smoke etc.

However I was in the end probably overcautious as it powered up ok with no signs of distress. I then hooked up a pair of test speakers – after also checking the amp's outputs for obvious DC faults (none), selected the radio function, then set back and enjoyed some "Bach in the Bach yard". I didn't go looking for this genre; it's just the first station, ABC classical, that I found.

The output stages of this set use the 'STK' style modules, so I wasn't figuring in getting great quality output, but I was pleasantly surprised, this thing ain't half bad.

Paul VK3TGX

September Contest Report

This year for the 2019 RD Day contest, I (VK3TIN) operated from a field station within a few meters of QF31IJ69DC (<https://k7fry.com/grid/?qth=QF31IJ69DC>). The station worked well and provided valuable experience while leaving some items for improvement. At the time of writing I am claiming a score of 402.

The Location:

If you follow the link to [QF31IJ69DC](https://k7fry.com/grid/?qth=QF31IJ69DC) you should get a satellite view of the operating location. For those reading along on paper the location is in Gippsland Victoria near the town of Alberton. This area had been subject to a small amount of flooding a month or so before the contest and was firm enough to drive and camp on but was easily soft down to a depth of 25cm.

The location borders the Tarra River and as there was no stock on the property there were no electric fences active. Interestingly there is a single wire power line within 500m of the location, but all the infrastructure appears new and it emits no obvious contributory noise and subsequently with the loop antennae I had effectively a zero noise floor with the exception of atmospherics.

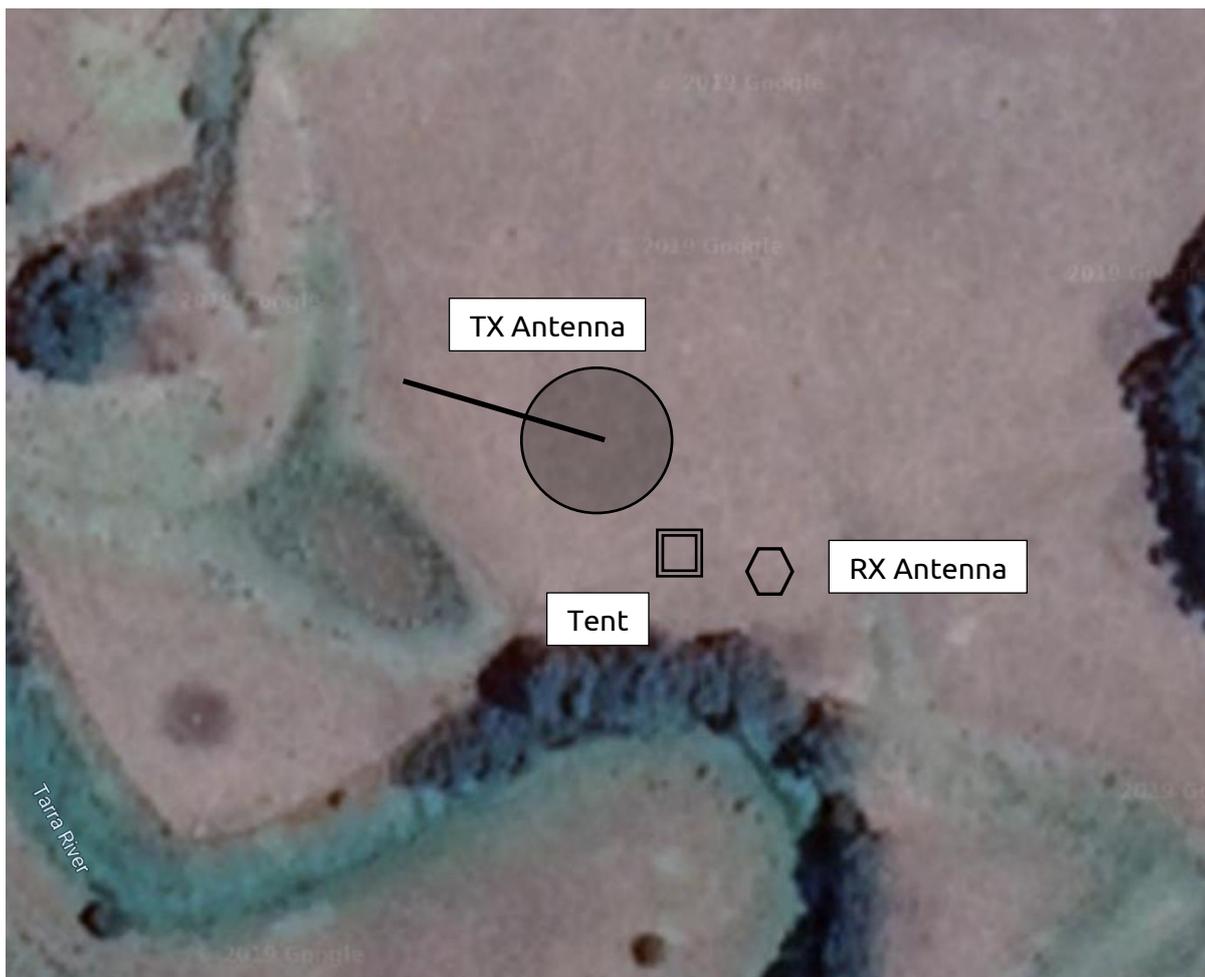


Figure 1 Shows the layout of the site.

The radio and operating position:

This station uses an IC-7300 Transceiver. The IC-7300 is an SDR based receiver that strikes a good balance between cost and capabilities. The unit has all the usual features of a modern radio and it has a touch screen display. This was the second time I have used a radio with a spectrum scope in a contest and I find it invaluable for pouncing on stations.

With the scope it is interesting that you get a feel for the stations by how they look and as the contest progresses, they become familiar. Throughout the contest I used a Heil Proset which I found got quite uncomfortable after a while.

The Radio has been fitted with a separate RX socket, I also built a relay switched diode-based input protection device so that the input is disconnected and grounded during TX and protected from strong signals at other times.

At the operating position I had access to the radio the controller for the remote tuner and the SPID rotator controller for the RX antenna, Figure 2 Operating position shows the operating position.

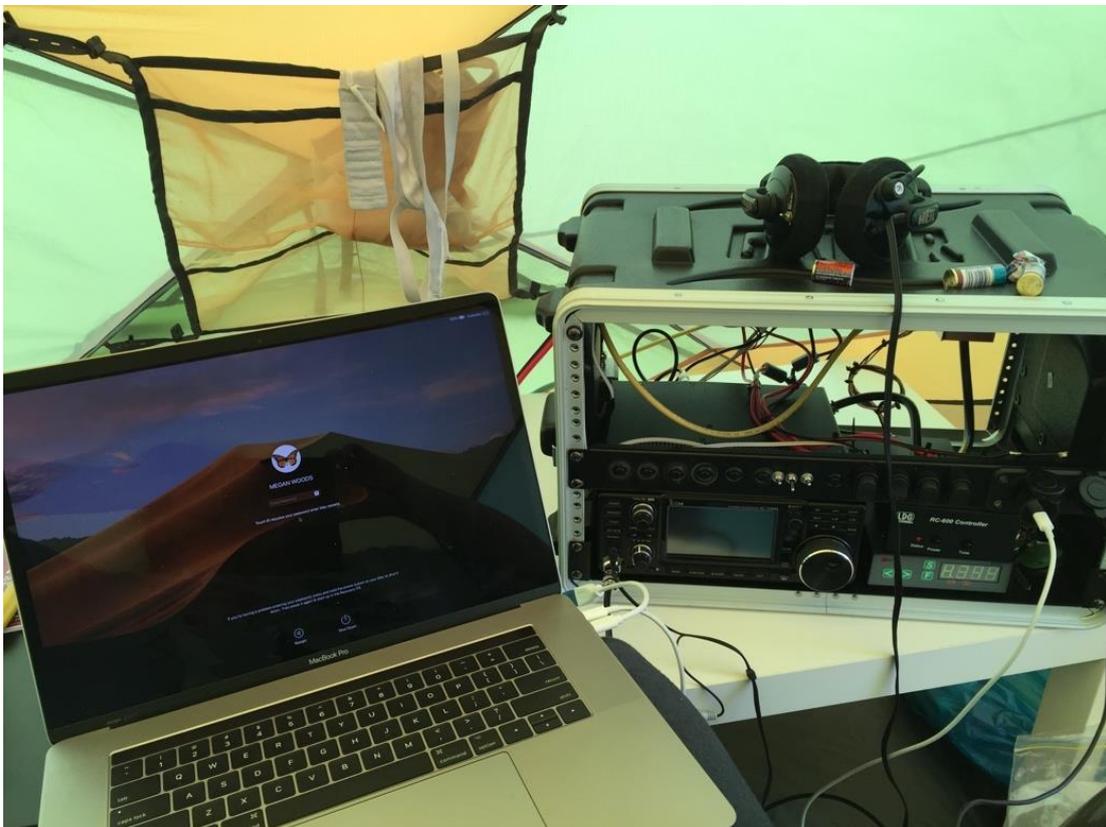


Figure 2 Operating position, containerised station and MacBook Pro used for logging.

All the radio equipment was containerized into a Gator Case for safe transport, thanks to containerization there were only five connections that had to be made while on site making the set up quick and easy.

1. Battery connection via large Anderson connector using a RV style mount.
2. RX antenna connection. (S/FTP Cat 6 RJ45)
3. TX antenna socket. (SO239).
4. Phone power was provided by a 12v USB adaptor socket adaptor on the front panel.
5. Laptop power was also provided by a USB-C charge adaptor also via a 12v socket on the front panel.

TX Antenna:

This station used separate TX and RX antennae with the TX antenna being composed of a large ~51.8m Random Wire antenna and a 9:1 UnUn immediately connected by less than 1m of RG213 to an LDG RT-600 external antenna tuner. There was an ~11m run of RG213 back to the radio. This antenna was used on 160,80,40 and 20m bands.



Figure 3 18m Spiderbeam mast, wire sloping to ground and match unit and LDG RT-600 tuner.

The radiating element wire was mounted to an 18m Spiderbeam mast, the wire ran vertically for approximately 16m and then sloped down and was terminated ~3m from the ground some distance away and towards the west. A field of radials was also used and was composed of 4x 4m and 4x 5m radials.

With respect to guying the 18 pole I followed the instructions that came with it. The poles are made in Germany and upon arrival you will need to make up the section clamps. These clamps consist of a hose clip, a strip of rubber and some heat shrink tubing. The required lengths are documented, and it takes about an hour to build them.

There is a local Spiderbeam distributor, but I found it easier to order them ex Germany because of time constraints and their support is excellent.

TX Match unit:

I make my own TX match units. My match units are an adapted version of the common 9:1 UnUn that people use with random wire antennas. My main adaption is to immediately use a common mode choke composed of several turns of both conductors around a type 43 ferrite core.

As we all know all antennas have two halves, even if one is not immediately obvious. In the classic random wire antenna, the second half of that antenna is the shield of the coaxial cable. I personally don't like that approach and take the position that any RF on the shield of the coax is bad news and can lead to functional instability within the station.

In my match units because I choke off the potential for the shield of the coax to be used as the second half of the antenna I need to use a field of radials connected to ground on the UnUn side of the choke..

Anecdotal evidence suggests that this approach provides a very usable multiband single wire antenna as long as the wire is longer than $\frac{1}{4}$ wavelength of the lowest frequency you wish to operate on.

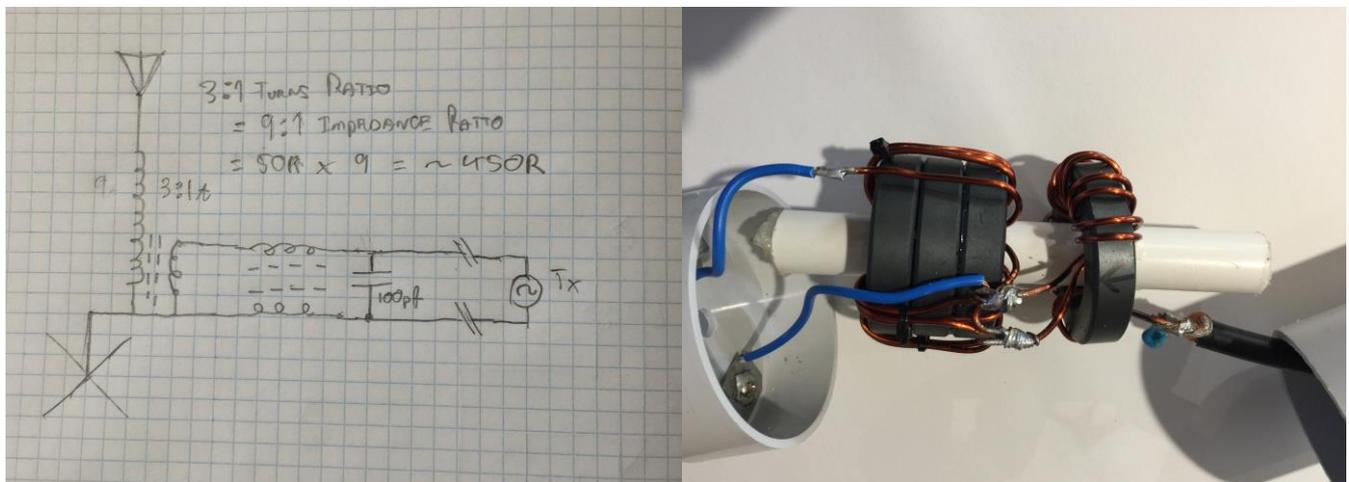


Figure 4 Schematic of match unit, Type 43 material used in all cores. Capacitor was 15KV rated, the physical layout matches the schematic.

The eagle eyed may notice a dry joint, it broke when I took the unit apart to take the photograph. Lucky it did not fail on the day, big wires and a lack of heat.

On 20m mid-afternoon on Saturday I worked a station in Cooktown the operator reported that I was more or less S9 and a NZ station reported similar signal strengths, so I think that configuration at that location with that level of soil moisture worked well. Reports for lower bands were also complimentary, I did not receive any comments about being hard to work.

It should also be noted that the random wire antenna is anything but random. The length of the wire must not be a factor or a product of the wavelength you intend to work. If the length is wrong it may not work at all or will only on some bands.

<https://udel.edu/~mm/ham/randomWire/>

I ran 90W for the entire contest.

RX Antenna:

The RX antenna consisted of a LZ1AQ Active loop antenna amplifier. The kit has the ability to remotely switch loop configurations, which is useful however during the contest I set it up once and left it. In this installation I used four loops, which were wired as a crossed pair, loop +A, -A and loop +B,-B. As the amplifier has the ability to switch configurations remotely these loops can be switched to form a dipole antenna, or as A+B or A-B. This was my first deployment of this product and a lot more experimentation will need to be done before I can give a firm opinion. At no point did it give me the impression it was deaf. The bands were packed during the contest with local stations and I could hear inter-USA chatter at times.

The RX antenna is directional, but I found during the contest, the VK stations were workable regardless of the antenna direction so after going to the trouble and weight of taking a rotator I used it once to face the array NW and that was it. DX stations do require aiming with notable signal improvements when aimed. (Observed at the home QTH.)

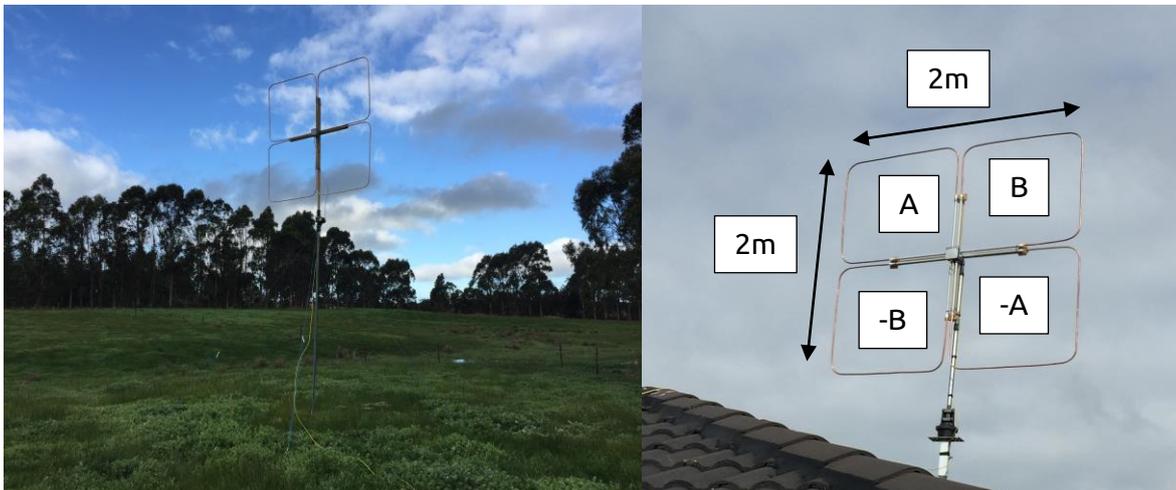


Figure 5 RX Loop antenna, Loops A and B are crossed. I included the second picture as it has better contrast. The second unit is my home RX antenna.

Folks are using two of these units for diversity reception, if you have reasonably balanced hearing (not deaf in one ear) then you should have a listen to the following YouTube video with headphones on. It only works with headphones on because your brain is part of the decoder hence the need for reasonably balanced hearing.

<https://www.youtube.com/watch?v=GqvmXoqOXCE>

LZ1AQ Active Antenna site.

<http://active-antenna.eu/>

The receive loops were mounted to a wooden frame, which was connected to a rotator. The whole assembly was mounted on top of a 3m piece of square tubing 35mm ex Bunnings.

Operating:

The RD contest is interesting in that it is basically a VK contest where you have to ability rework stations every three hours for same band. It is also interesting because you start to recognize stations and it fosters a sense of comradery especially overnight. The relatively small number of 24 hour stations can make it a little dull at times and you end up working a bunch of stations in very quick succession and then it goes quiet.

I tend to switch between calling and pouncing where I will call until I stop getting answers and then move up and down the band looking for stations.

My noise floor shifted from S0 to basically S3 but only in crashes which I assume were atmospheric related given they lifted the entire display. I did not have the ability to easily switch to the wire antenna for RX so I am unable to give a side by side comparison.

On the Saturday thanks to a very late night on Friday (Club meeting and McDonalds for coffee) I started the contest about 45 minutes late. In a big contest this would be a significant loss of time but in the RD it probably does not matter so much because they will work each other out then be stuck for new stations reasonably quickly.

Given I was late I did not get a chance to relax before getting stuck-in so I sat and listened and got a feel for the RX side of things.

This RX setup in that location was the first time I had observed so many stations from different states overlapping so I assumed they could not hear each other. This is in complete contrast to my QTH where I may as well be living next to tesla coil enthusiasts and the landscape means my antenna is in a bit of a gully and naturally shielded.

The contest was busy enough, not solid flat out hours of work but bursts of intensity followed by relative calm. One thing I think is very important and that is for operators to stick to the contest exchange as defined in the rules. There were a large number of stations wanting location and name and in one case demanding it and coming back over the top of other contesters to get it.

The reason to stick to the contest exchange is simple, in this contest the winner is the one that works the most stations and gets the highest score. Any part of the exchange that is not relevant costs time and points. Personally, during a contest, I do not care where you are or who you are all I want to do is exchange numbers and move on, extra info is just not relevant at that moment in time. Contest logging is not general logging.

Another reason to stick to the exchange is that pouncing stations should be able to complete an exchange in about 10 seconds or possibly less. If I hear, "we are located about xx km south of yy." it is advantageous for me to not waste time waiting for you to finish but to continue up or down the band and work more stations. When I have to do this, you become a low priority bit of spectrum on the scope and probably not worth the hassle until the very end of the sweep. The other thing is it is important to quickly identify if a station is even participating in the contest especially if you can only hear one party.

So please try to stick to the exchange as much as possible because every point counts.

Pros and Cons, hard and surprising and things to do better.

Pros:

- a. RX antenna worked well.
- b. Containerized radio and ancillaries were really good and simple to deploy.
- c. 120Ah battery made it to end of contest powering Transceiver, Laptop, RX Amp and phone.
- d. TX antenna system worked well.

Cons:

- a. Mismanaged sleep leading up to contest.
- b. Too much gear for my vehicle.
- c. RX antenna system very heavy to put up.
- d. TX antenna sometimes subject to 8 second tune times.

Hard:

- a. A lack of tilt up bases made walking up antennas hard.
- b. Guy ropes need to be on proper winders not on bits of wood.
- c. 18m pole quite whippy at end needed an uncomfortable amount of tension, to hold wire up better to deploy with some sort of end support pole that is free standing.
- d. RX antenna was a lot of work, it needs to fold up completely and the copper tube replaced with wire held out by some sort of collapsible frame. It was almost too heavy for me get up and if it had fallen it would have been junked for the contest.
- e. Wet ground and grass ultimately filled my boots with enough water to slosh, next time take three pairs of socks.

Surprising:

- a. A band full of stations.
- b. Low noise.
- c. It was 18°C / 19°C.

Things to do better:

The nature of a random wire antennae is that the radiating element is approximately 450R and when matched with a 9:1 UnUn the impedance ends up somewhere around 50R. You can then use a tuner to trim out any remaining mismatch. Sometimes “off to the side tuning” may not be good enough depending on band / wire length and you will get high SWR when you move back to the required frequency.

The LDG RT-600 has a reasonably fine degree of tuning with many steps between its upper and lower limits. The algorithm the unit uses defaults to exhaustive searching if does not already have that frequency stored or its initial search algorithm does not find a suitable match. This searching feels like an eternity to wait and the entire arrangement was not agile enough for pouncing.

I chose the random wire because it is a one wire to setup and deploy but in hindsight because of that choice I ended up with a control problem in that the system lacks agility.

One solution would be to train the tuner as part of deployment by writing some software to step the radio through every 2.5KHz for the frequency ranges of interest and force the tuner to learn and then move on, that way the tuner would have a decently populated internal lookup table and not have to revert to a full search so often. It would, however, be uncouth behavior on the bands.

The other alternative would be to set up a fan vertical defaulting to "L" for the lower bands using multiple more accurately cut wires fed from a drive plate with a few more radials out to different lengths. (Google "DX Commander" to see exactly what I am talking about.)

Finally, this contest was its usual barrel of fun. Once set up and after the sun goes down, I entered the world of radio in way I cannot experience at my QTH, the whole exercise is 100% worth the effort and cost. The cons and things to do better are edge cases and not fundamental problems with the station.

It will be interesting to see how well I score in the end.

DXCC leader board:

VK3BDX, David Burden (209)

VK3KJ, Scott Williams (181)

VK3MH, Brendan Bryant (163)

VK3SIM, Simon Keane (162)

Contests to start planning for:

OCDX contest, first and second full weekends in October for phone and CW respectively.

See: <http://www.oceaniadxcontest.com/index.html>

CQ World Wide, SSB 26/27-Oct-2019, CW 23/24-Nov-2019

(Study the rules and stick to the exchange, they take no prisoners.)

<https://www.cqww.com/>

Over and out, caught and bowled.

73s de VK3TIN

Graeme VK3XTA (sk) sale list

Graeme's equipment is almost gone
There are 3 tubs of extra's (as in freebies) that will make their way to the club

Amateur Radio & Electronics Items

Item	Description	Condition	Price
17	CW memory keyer, kit built, good for parts	poor, but may still work	4.00
103	Rangemaster 158.150 Tx Rx Quarry	unknown	5.00
107	Realistic (Tandy) sound level meter	powers on	15.00
126	Voxon 12V car amp, 2x30W, with graphic eq	unknown	2.00
150	EA Dick Smith R&C bridge	unknown	10.00
166	Dummy load, 50W, with sniffer port	unknown	15.00
171	Antique camera tripod, 1.14M fully extended	looks good	10.00
178	CD-RW drive	new in box, unused	1.00
183	Telescope/microscope electronic eyepiece (camera) PAL composite out	unknown	25.00
187	Function generator, DSE/EA	powers on	15.00
193	Yaesu FT-708R hand held, with manual	unknown	20.00
200	Digital signal meter, 46-870MHz, Graetz TC870B & bag of adapters & man	Powers on (RRP \$770)	200.00
201	Chinese 'Megger' ZC25-3 (brought back from China by Graeme)	unknown	30.00
218	Gator? Reversing camera kit, monitor in replacement rear view mirror	unused, in box (\$250 new,	50.00
219	Kenwood TK-340 with KNB-7A battery	unknown, well used	20.00
220	Uniden Pro510e CB radio	unknown	10.00
233	Kenwood TK-310 HHT	unknown	10.00
234	Kenwood TK-340 with speaker mic	unknown	10.00
249	Codan 7816 Radio Teletype Terminal	unknown	15.00
250	Quest CA-12 Sound Level Calibrator	unknown	15.00
251	Kenwood VOX-3	unknown	15.00
252	Yaesu FT-2400	unknown	100.00
253	Kenwood TR-9000 2M all mode	unknown	70.00
254	Realistic (Tandy) TRC-215, 4W Six channel 27MHz CB hand held	unknown	2.00
255	Philips SXR, 5 channel handheld, no battery, band & crystals unknown	unknown	2.00
256	Electo MT-1, Multimeter tester, 100K ohm limited ???	unknown	2.00
262	2 large metal frames (cases) 421mmW x 445mm H x 340mm Deep	'worn'	10.00
267	High temperature meter	powers on, reads ambient	20.00
268	Codan 8525 SSB transceiver	unknown	100.00
269	Codan 7727-TB SSB transceiver with '619' control head, no lead	unknown, for parts	10.00
273	Video head tester	unknown	1.00

Pictures of the various items are on DropBox at

<https://www.dropbox.com/sh/tkqdq6hlq1oq9ru/AABYDrL8LCu4RZadFkL3l7UOa?dl=0>

AMATEUR RADIO IN ANIME

Recently an award winning Japanese Anime movie went to air on SBS, titled: 'Your Name' In one of the scenes the lead character visited a friend's house, who was a bit of a tech-head. In the background of this scene we can see the famous Kenwood TS520S on the bench, the same model used in the GGREC Shack. Next to it is what appears to be a matching Kenwood VFO.



It raises an interesting observation. As an animated cartoon, there is really a bit too much background detail for it to have been entirely hand-drawn. When zooming in on just the radio, there is so much detail that it appears to have been taken from an actual photograph, then digitally rendered slightly to make it look hand-drawn. The radio was never used in the movie.



At even higher resolution, not easily reproduced here, there is a faint JA callsign written under the VFO knob. While the radio first came out in 1977, the movie is set in present times and most characters run around texting each other on their mobiles.

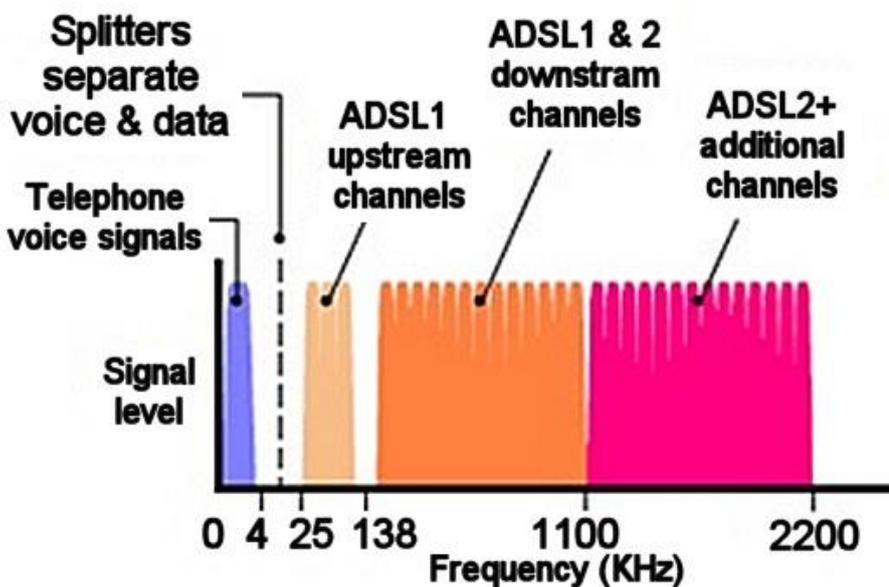
On TV, modern radios never look quite as good as the classic rigs. This Kenwood unit was always one of the prettiest bits of equipment to be seen on a benchtop. A true work of art.

Phones & the NBN



Recently I finally upgraded my internet to the NBN, Well that is not quite correct; we used to talk of the home phone & the internet as two separate entities, even though most people received the two on the same 2 wires. My involvement in data comms could be said to start back shortly after buying my first computer. At the time I worked for Telstra, or as it was called back then Telecom as a trainee technician. My first modem being an obsolete GE DM200 modem (scored from scrap at work) that was modified to work at the dizzying speed of 300 bps (the DM200 was originally a 200 baud modem). Back then dial up modems were supposed to be connected to a special '611' socket wired up as 'mode 3'. In this setup the incoming phone line would first go to the modem, then from the modem, back down its lead to an adjacent regular phone socket where the signal then went on to your phone. If one was a really keen Telecom tech, you would extend this scheme to cover every phone in the house, as in when the modem goes on-line ALL the houses phones get cut off, no more corrupted file transfers from someone else picking up a phone attempting to make a call.

Unfortunately for anyone not being a Telecom/Telstra tech this usually didn't happen, they would buy a modem and just plug it into a regular socket, the adjacent phone would get plugged into a socket on the back of the modem (Initially Telstra modems didn't support this) and if someone picket up another extension, mayhem (and a few screams) would ensue.



Enter the world of ADSL, Now the phone line is split, frequency wise to allow both voice and data at the same time.

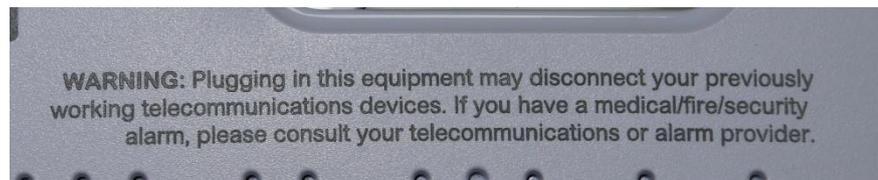
If you only have one phone & socket all is well, however if like most people you have two or more then problems can occur. As you can see, the frequencies involved extend up into the megahertz, and having a few extra unterminated lines attached can and does cause issues.

A better approach, not often mentioned is to have a whole house ADSL filter fitted, the 'raw' ADSL now only goes to the one socket, all the others are now behind the filter and don't get to interfere with the signal. Of course this is too hard, "don't tell the customer this, as it may poison the sale, or offer to fix it as that will eat into your profits" is the ADSL provider's tune, and they usually got away with it.

Now we have the NBN, for most new installs, the signal actually enters the home on the same two copper wires, using a signalling scheme called VDSL2, the big brother of ADSL, it takes the whole bandwidth from zero to 30MHz, no more analogue section for phone calls. If you want a land line phone, then that 'signal' is digitized by your gateway/router and sent over the NBN with all the other traffic using a 'protocol' called VOIP. Originally the NBN had optical fibre into the home, no VDSL or copper wires, "Too expensive" cried the politicians so they brought out 'Fiber to the node' FTTN and used VDSL to get the data into your home, now as you can probably imagine, shoving 30MHz signals up a twisted pair, only originally intended to handle voice up to 3.4 KHz is bound to have issues, and boy did it.

Enter Fibre to the Kerb, or 'FTTC' (They let us get saddled with 'US' English, 'C' is for Curb). This is much better as the copper tail from the fibre box is now considerable shorter, hopefully to just out the front of your, or your neighbour's house, not 500M+ with FTTN.

Unfortunately, to save money, they will try and give you a self-install kit and hope it works ok. Unfortunately one will probably have a house full of sockets and random 'transmission lines' all randomly joined together that somehow has to work up to 30MHz, all relying on some very smart signal processing that can figure out what frequencies (channels) not to use as the frequency response of this hodgepodge is all over the place. Their advice is that if it's not working so well, just go and try another socket, with no regard as to whether this other socket is in a useful location, or not, like in the middle of a wall, behind a wall phone in the kitchen.



The other almost bigger problem is they then tell you to unplug everything from all your phone sockets before connecting the NBN, and then never tell you

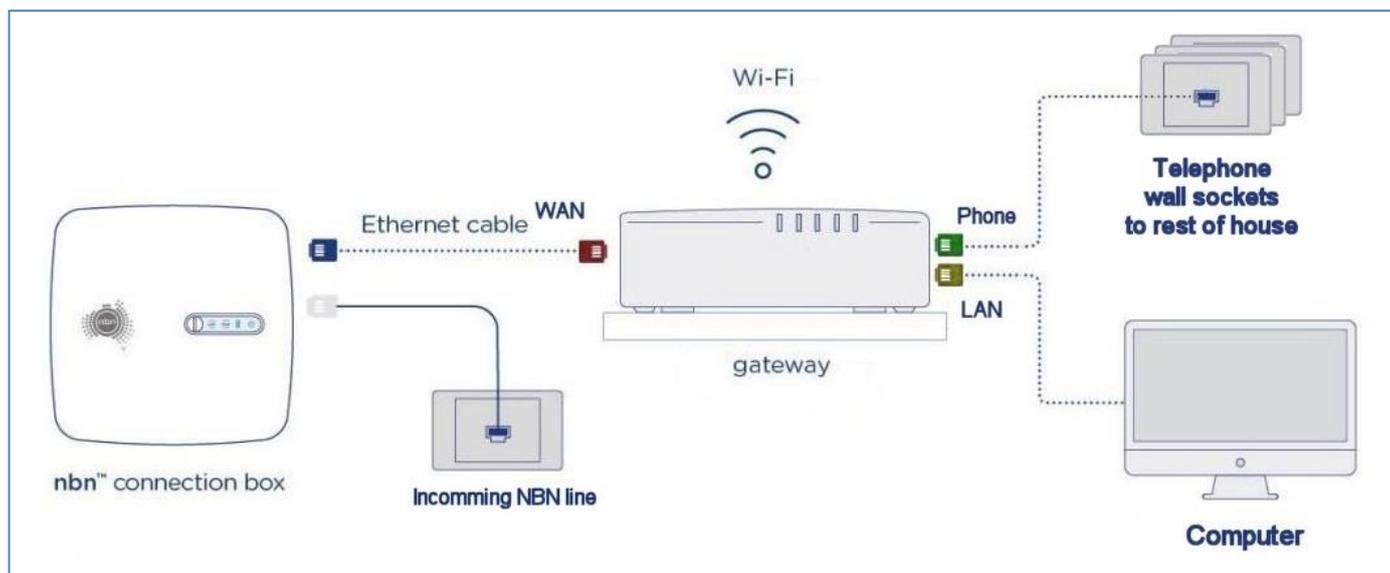


how to reconnect any of your kit. I've heard far too many people say "I now have the NBN, so no more home phone". Maybe it's a good time to review your home phone setup, but being 'forced' *Yuk!*

On the back of the router/modem/gateway provided in your NBN kit should be a telephone socket, (The green one, in my case) and the best that you usually hear is to plug a wireless phone base station in here and use that as your home phone, assuming this is the perfect solution for everyone. Like a cordless phone is going to make it from my study to my backyard radio shack – yeah tell us another one.....

No, what you really need to do is to isolate all the houses phone sockets from the incoming line, then connect just the incoming line directly to your NBN connection box, and then connect the now isolated household phone network to the "Phone" socket on your Router/gateway box.

I currently have good half dozen devices connected, so far all is well. I have yet to test my Fax machine, however no great loss if it does not work. One thing I know that is out for me is decadic pulse phones. (Still ok for answering, just don't try and call out)



In my case, as part of a whole-house ADSL filter, the incoming line was already running directly to my study, and ripping out the filter effectively disconnected the house from the incoming line, so 95% of the work was done by just ripping out the filter, as dictated by NBN co.

I was kind of lucky here, you will probably have to pull the lids of all your phone sockets to try and identify the incoming line. Usually the incoming phone line will have a black PVC outer sheath, whereas normal internal phone cable has a much lighter duty white outer sheath. If this tip fails you (they may have spliced the incoming cable into regular white cable under your house somewhere) then the next tip is to disconnect everything and use a multimeter to look for the 50V from the phone exchange, this one is assuming you are doing the work before the normal incoming exchange service is disconnected, so get in early and don't wait until the local exchange gets decommissioned etc. NBN co says you have 18 months from when you are advised that service is available, till when they pull the plug on the old phone system in your area. With the 'old' system, the telephone exchange feeds 50V down the line to you, however with NBN FTTC, YOU feed 60V back up the line, to power the kerbside box out in the street. So if you unplug the NBN gear, you won't see anything with your multimeter. I kind of think the older system was easier to diagnose.

Normal '2 pair' phone cable has 4 wires, White, Blue, Red, and Black, the phone usually connects to the white & blue wires, the red & black are spares for extra's etc.

Hopefully the incoming line will terminate somewhere useful for you, not behind a wall-phone in the kitchen etc. If it does, then you are up for a touch of rewiring, that technically and legally, I have to advise you to get a phone tech in.....

I was actually surprised when I put my NBN order in; I was kind of assuming the phone would go dead when someone swung my phone line from the exchange over to an NBN box in the street. A week passed after receiving my kit via a courier and nothing had happened, so in the end I just plugged in the NBN connection box and it started saying I had a connection! So my line must have gone via the kerbside unit to the 'old' phone exchange, and when I plugged in the NBN connection box, the line was automatically switched over. Was it already setup this way, or did someone come and tweak things without telling me, assuming I wouldn't notice a loss of service for a few minutes. I kind of assume the latter, because why connect every house as not everyone will sign up, many may just choose to use a mobile phone for everything and just let the old phone network die and go away. Telstra was experiencing quite a decline in the home phone market, so maybe the time was right for pulling the plug on the old-school phone system. Or maybe the NBN will turn out to be a total loss as the 5G mobile network takes over, but then again 5G may never be able to support everyone watching Netflix etc. after dinner. The 'NBN fixed wireless' option certainly gets killed by Netflix etc. Only the fibre based systems seem to be able to handle it.

AVOID BEING SLUGGED – FIX THINGS YOURSELF

Ian Jackson VK3BUF

THE PROBLEM

Two weeks ago I was in the shack quietly working on some emails when I heard a loud click in the adjacent plant room. There are around 140 double power points in the house and somewhere, something wasn't right. About ten seconds later Di wonders in and says "Hey, the power is out in the south half of the house."

We entered the plant room and could see that an earth leakage breaker (RCD) had tripped. I reset it (in case it was a nuisance trip) and it immediately tripped again. Not nice. This particular RCD device serviced three separate sub-breakers, I turned all of them off, reset the RCD again, then brought the sub breakers back in one at a time. Breaker number 3 caused another trip. Fine then. There must be an Earth Leakage problem somewhere in the kitchen. We pulled every bench top kitchen appliance from its power outlet, but the RCD would still trip. Just one appliance remained. Under the sink was an extra power outlet for the dishwasher. The next check confirmed that whenever the dishwasher was plugged in, the RCD would trip.

THE CAUSE

So the dishwasher was crook. It's a Fisher and Paykel dual drawer unit. We've been working this unit hard for the past 18 years. I'd done a little work on it in the past, but they are a pretty good machine. It is effectively two completely independent dishwashers, one above the other, fed from a common power cable. An excellent concept for the kitchen, as while one drawer is slowly being loaded with dirty dishes, the other can be actively washing and drying a previous load. It really is a great system.



I pulled out the bottom drawer, lifted it from the sliding rails and carefully pushed it to one side. Now I could detect a faint burned smell. With head and shoulders in behind the drawer, I slid the cover from a pcb module from the very base of the unit. The smell intensified and I could see the problem. These units have a small module where the 240V supply enters. It's slightly filtered, then distributes power to each washing drawer. The module also acts as a flood-sensor. If a seal breaks down or a hose leaks, water shorts out between a pcb pad and the machine earth, to force the unit into a 'Flood Fault' mode. We had no flood, but a small slug had crawled onto the pcb and fried itself between earth and one side of a 240V live optocoupler chip. Not nice.



One small slither for a slug – one giant inconvenience for mankind..

REPAIR #1

So I removed the module. Turfed the fairly stiff slug into the bin and could see black char marks in the pcb from earth to a 4-pin optocoupler. One leg had been vaporised. As a rule, if things arc and burn a pcb, any black crud remaining in the board provides a residual current path that will cause future problems, particularly at high voltages. It has to be removed. A small engraving tool with a mill tip did that ok, followed by cotton buds and acetone cleaner.

The optocoupler was a common type and I had some spare ones handy. The above picture doesn't show it, but there is a bunch of trackwork and surface mount devices on the reverse side. Apart from light corrosion, the board now appeared to be intact.

As a preventative step, I decided to coat the board with clear pcb spray, so connectors and tags were covered with tape and I gave both sides a good coating. Dried it off, put everything back together and powered up the machine. No more earth leakage trips, the lower draw powered up with its familiar chime... but the upper drawer was completely dead.



Dual dishwasher - Top drawer exposed

REPAIR #2

A little more background on this machine. They were cutting edge technology when first developed, featuring many unique innovations. It is a product of New Zealand. To punctuate this, I found that when I removed the front cover, some zealous production line fellow had written *New Zealand* inside with a felt-tipped marker, complete with smiley face. The motor in the base is an *avant-garde* device which uses a cluster of software controlled coils to rotate magnetic fields around a water submersed agitator. Rotate one way and it pumps water around the inside of the machine as a fierce spray. Reverse the direction and it becomes a drain pump to suck the water out and down the drain. Clever stuff. Very few moving parts to go wrong. Still, mine remained quite dead.



Special rotating-field motor

I un-clipped the front door skin to expose a microprocessor controller in a plastic case. I removed it for a closer examination. As horribly complicated as it looked, I felt that there couldn't be much wrong with it. Erratic operation would have meant a suspect microprocessor or driver part, probably requiring a board replacement. But total inactivity implied a power problem. As the original fault had been a slug on the power rail, it meant that it was a power rail that had been compromised.

On the board was a Switchmode voltage regulator, powered via a bridge rectifier. This was made from four surface mount diodes. It all looked ok. With a multimeter in its semiconductor junction test mode, I checked the four bridge diodes and found one that had shorted out.

Using two soldering irons simultaneously, (first taking note of its polarity) I removed the faulty diode. Again I was fortunate enough to have a replacement 1 Amp surface mount diode in my stash of parts.



The logic board complete with the blown diode

I put the board back together and figured it was worth another try. Regrettably it was still dead. One of the advantages of a twin-drawer system is that the second drawer becomes a test area. I put the repaired controller in the lower, working drawer. It worked fine. Then I put the good lower controller in the upper drawer and it did nothing. There was definitely a third fault to deal with. Somehow there was no delivery of power from the bottom AC filter module to the microprocessor unit in the top drawer, but I couldn't see why.

REPAIR #3

Back to the internet. I searched for dishwasher circuits and eventually came up with a basic wiring diagram for my unit. The diagram confirmed that the AC Neutral connection wired direct to the top drawer. However, the AC Active disappeared into something called a Heater Plate. I didn't know what that was, but it was preventing power from reaching the top drawer.

Ok, long story, slightly shorter. There is a dinner-plate sized disc with a big hole in the middle for the motor/impeller unit. It's really hard to reach as it's covered by various wires, hoses and plastics. Once removed, the disc looked like something Tron would have hurled on the battle grid to vanquish his digital opponents. The plate is ceramic coated. Printed on the underside are resistive tracks. When these are powered, it heats the wash-water in the bottom of the dish drawer. A strange approach but cute.



The heater pate with its vaporised section

The supply is 240VAC, but the controllers work from roughly 120VAC. To drop the voltage, they printed an additional resistor on this ceramic disk.

The idea being that the heat dissipated by the resistor would contribute to heating the water. My faulty disc had blown a gap in its resistive track, isolating the AC supply from the top drawer. It was not repairable. I couldn't solder (or silver-solder) the track material. It wouldn't bond. I couldn't drill and rivet a strap across the fault. The wash water is usually on the top side of the plate and 240V on the bottom. It was very much a custom part. An internet search found one as a spare part in a Brisbane warehouse for \$135. I paid the money and waited the five days for it to show up. At least we could still wash dishes in the lower drawer.

THE RESULT

So the new disk was fitted, the unit reassembled and it worked fine. Both drawers can wash dishes and a family crisis has been averted. The failure went like this: The slug on the lower pcb had spiked the supply causing the SMD diode in the upper controller to short out, which then drew extra current and blew the printed resistor in the heater plate. If I had called in a service tech to repair the machine, it would have been really expensive. Locating three separate faults in different locations would have been a slow process for any field operative. Also, service staff never repair circuit boards, they just replace them. Another option would have been to purchase another dishwasher. Presently, two-drawer units similar to ours are about \$2000.

To quote the Galaxy Quest signature motto: *Never give up, never surrender.* The key to fault finding is to persist and not to try and embrace all of the faults in their entirety, but to identify parts that can be treated, treat them, then move onto the next symptom. Sure it cost us \$150 for a replacement part and postage, but any other alternative would have been much, much worse.

I still don't know where the slug came from. It must have been moving very slowly, as it had taken 18 years to find just the right place to wreak maximum havoc. I don't know if that makes it a very clever or very stupid slug. Either way, it is now a very dead slug and the dishes are sparkling clean.

Meeting 16/08/2019





Club Information



Meetings 20:00hrs on third Friday of the month at the
 Cranbourne Guide Grant Street Cranbourne
 Prac nights first Friday in the Peter Pavey Clubrooms Cranbourne 19:30hrs
 Visitors are always welcome.

Office bearers

President	Tony Doyle	VK3QX	Web Master	Megan Woods	VK3TIN
Admin Sec	Rob Streater	VK3BRS	Magazine Editor	Paul Stubbs	VK3TGX
Treasurer	Megan Woods	VK3TIN	Property Officer	'committee'	
General 1	Helmut Inhoven	VK3DHI	Assoc. Secretary	Rob Streater	VK3BRS
General 2	Leigh Findlay	VK3FACB			

Call in Frequencies, Beacons and Repeaters

The Club Station VK3BJA operates from the Cranbourne Clubrooms.
 6m Repeater Cranbourne VK3RDD, In 52.575 Out 53.575 CTCSS none
 70cm Repeater Cranbourne VK3RGW, In 434.475MHz Out 439.475MHz CTCSS 91.5Hz
 VK3RGW Repeater supports Remote Internet access (IRLP), Node 6794.
 70cm Repeater Seaview VK3RWD, In 433.575MHz Out 438.575MHz CTCSS 91.5Hz
 Simplex VHF - 145.450MHz FM, Simplex UHF - 438.850MHz FM
 VK3RLP Beacons 1296.532MHz & 2403.532MHz (currently inactive)

Membership Fee Schedule

- Pensioner member rate \$40.00 Extra family member \$20.00
- Standard member rate \$50.00 Junior member rate \$25.00
- Fees can be paid by EFT to BSB 633000 - Account 146016746
 - Always identify your EFT payments
- Membership fees are due by each April Annual General Meeting (AGM)

Magazine Articles to editor@ggrec.org.au Cut off, 10th of the month
 All other Club correspondence to: secretary@ggrec.org.au
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