



GATEWAY

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

February 2018



**The Emigrants Guide – Review
VK3RLP Repeater Repairs
Playing With UPS's
And More**

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Note: - club meeting minutes are now on the club website

Event Queue

February:

- 16th General Meeting
- 18th WANDARC HamFest, Italian Sports Club, Werribee
- 25th VK2 Wyong Field Day

March:

- 2nd Prac Night – Club rooms
- 16th General Meeting
- 25th VK3 EMDRC HamFest, Great Ryrie Primary School, Heathmont

April:

- 7th-8th Antennapalooza - <http://antennapalooza.org.au/>

PRESIDENTS REPORT – Ian Jackson VK3BUF

My, that was fast, I'm sure it was only a couple of days ago that it was last month, but my computer says it is now Feb, so it must be. Certainly last month there was an extra car in Elon Musk's garage that doesn't seem to be there anymore. I'm sure it will show up if he looks hard enough.

One of the responsibilities of any Treasurer is to ensure that the books are balanced at the end of a year. The GGREC is not broke, it has a good amount in its investment account and it remains a viable entity, and yet costs have risen, more and more members have eased into the pensioner rate. If it were not for our extra fundraising via the annual Hamfest Sale the coffers would be sliding backwards by around \$1000 per year. Chris our Treasurer has been doing some analysis which shows that perhaps we should be doing something about it. Whatever we do, if anything, will be a joint decision. It will be a topic for discussion this Friday night

Also this Friday night we will learn a bit more about Heard Island. Chris VK3QB will be giving a presentation about what it's like to operate from this handy location, about 4000km south-west of Perth. So rarely is this site activated, it should have been called Never Heard Island. Not a lot of trees there to tie antennas to, so a better method is to clove-hitch each end of an 80m dipole around the head of a couple of stout looking penguins and send them off into different directions. To keep the wire tight, first place two fish on the ground, 42 metres apart.

Our 6 metre repeater VK3RDD is up and running, thanks to the team of helpers that attended the shack last month. There was a lot of work involved that ran from 9:00am to nearly 7:00pm, but we had a good outcome. We used the boom lift to elevate the 8 metre long pole over the fence into the waiting steel brackets. On top of that we added the tall J-pole previously used with the repeater. An oldie but a goodie. The repeater does support subaudible tone access, which was useful at the previous location, but it appears to be fairly quiet on 6M in Cranbourne so we have turned tone access off to see how well it holds up without it. It transmits on 53.575MHz and receives one meg lower on 52.575 MHz.



Top view showing Michael VK3GHM tightening the mast support bracket, which links back to the Shack roof



A peek inside RDD, showing the six cavity filters at the top of the cabinet.

Not too far from the new mast some of the trees were growing too close to the antenna, so 12 metres up, we did a bit of judicious pruning. One less thing to worry about...

Next month Michael VK3GHM will give a presentation of what he found when he visited the original Marconi transmitter site at Carnarvon in the UK. This is an important bit of history mostly forgotten by the rest of the world, but remains something of a sacred pilgrimage to radio people.

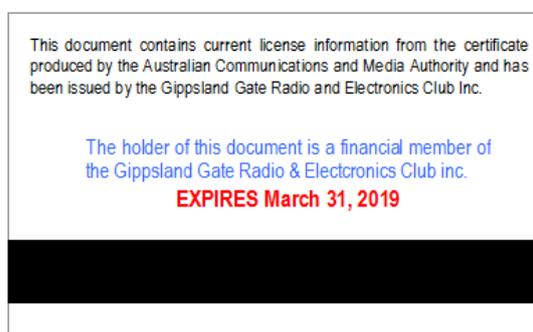
We had our Australia Day barbecue at the Guide Hall last month. A fine day and a good turnout. No sausage was left unturned when we came together to celebrate what it means to be a citizen of this great land of VK.

Another thing that happened a couple of weeks ago was that awesome ellipse of the moon. It was a super clear night and I managed to capture a few images from Drouin West. At the height of the eclipse the stars all came out and the Milky Way became a vast speckled band from horizon to horizon. There were colour shifts as the moon was gradually consumed in shadow and eventually became what was called a rare Blood Moon. I certainly gave it an A+.



*For the record, that's actually two pictures of the same moon.
We only have one of them.*

At the last General Meeting, we resolved to resurrect the GGREC license card, to be used as a general identifier of Amateur Radio operation and it also helps qualify for discounts with Altronics in Springvale. On the last prac night we printed about a dozen of them on the spot. On Friday night I'll take a camera so that we can prep some more if needed by members and return the finished cards at the following meeting.



The cards are business card size and laminated. For current members we are setting the expiry date at 2019 because we are optimistic that all members will pay their fees in April.

Also coming up in April is of course **Antennapalooza**, so put aside April 7 and 8 for a weekend of Amateur Radio education and frivolity. The perfect event for new entrants into the hobby. We are looking at a '**Build your own antenna from coat hangers**' competition on the day. The expression '*Get Bent*' will become a compliment. Full details will emerge next month. Check out: <http://antennapalooza.org.au/>

See you This Friday Night!

From The Editor

So what is new in 'TGX land, unfortunately smoke this month.

Whilst testing the Tx radio from the club's 70cm repeater, I chose to do a spot of maintenance on the shacks computer, an Intel i3 running Windows 10. Recently my main PC in my study had received the windows 'Creators edition' update – to version 1709, so I was slowly going around and encouraging my other lesser used Windows 10 boxes to also do the update. This is a major one that can easily have your computer tied up for several hours. The last thing I wanted was for it to start a multi hour saga 5 minutes before I would normally shut down and head for bed.

So with that well and truly underway, I headed back into the house to see how Marianna was going (Lunch?). When I wandered back into the shack I was horrified, the power was off. Turning off any PC mid update is NEVER a good idea, especially a major one like this.

So after saying a few bad words, I reached for the shacks desktop earth leakage breaker and pressed the 'go' button, which then issued a cloud of smoke!. The main power point that feeds my work bench is somewhat obscured by equipment, but boy did I get to it quickly and pull that plug. Looking back, I'm now scratching my head at my apparent speed.

After pulling it apart all was revealed, my favourite "Made in Australia" Miniprint caps had struck again. The two on the upper left came



from my earth leakage breaker, the one at the top caused the most smoke, however the one below it is not far away from doing the same thing. If you look closely as the larger 2uf cap you can probably see lots of cracking, however that is not from any electrical overload etc., this cap has spent most of its life in a component draw. The one at the bottom is actually the same 2uf cap, but upside down. I'm not sure if the outer resin is shrinking/cracking, or the innards are expanding, either way they are a disaster in waiting. When I worked for Telstra, a few fires were attributed to these.

When I find 'Made in Australia' I'm usually happy, but not with this crap. Go through your equipment, replace these immediately.

The Emigrants Guide - A book review by Ian Jackson, VK3BUF

It is difficult to rationalise any link between this article and Amateur Radio, but what the hell... This exercise began when I was trying to find a picture of a ship on the internet. Called the *Herald*, I think it is supposed to be one of the ships below. This ship had brought my ancestors to Australia in 1841. That was Joseph & Mary Jackson and four kids. They were listed as 'Ploughman' and 'Dairywoman', both noble professions I'm sure. It would have been a tough trip



at the time. 100 days at sea, no stops, 350 immigrants on a ship only 50 metres long. No drop-down trays, foil covered hot meals, movies and cold beer. No reading lights at night unless you had the foresight to bring your own candles. It was considered a good crossing to Sydney because roughly the same number of babies were born as what died along the way. The Jackson kids, between one and a half and 7 years old, all survived ok.

My internet search brought me to a book, about 300 pages in pdf form, called '*The Emigrants guide, or Ten years practical experience in Australia*' Which turned out to be a fascinating read of what people ought to expect if they chose to come to Australia for the rest of their lives.

It was written by a Reverend David Mackenzie back in 1845. In it he names the ship and the captain that had brought my ancestors here. Notwithstanding what the country was like back then, it was interesting to see how the use of language and writing style stacked up for a book written 173 years ago. Certainly it was a bit more flowery than contemporary writing, with phrases like: "*The salubrity of Australia is proverbial*" but I thought that it held up very well.

I had to remind myself that it was a very different Australia than it is today, with a national (white) population of around 130,000 people. Melbourne had only 7000 occupants, which made it about half the population of Drouin today

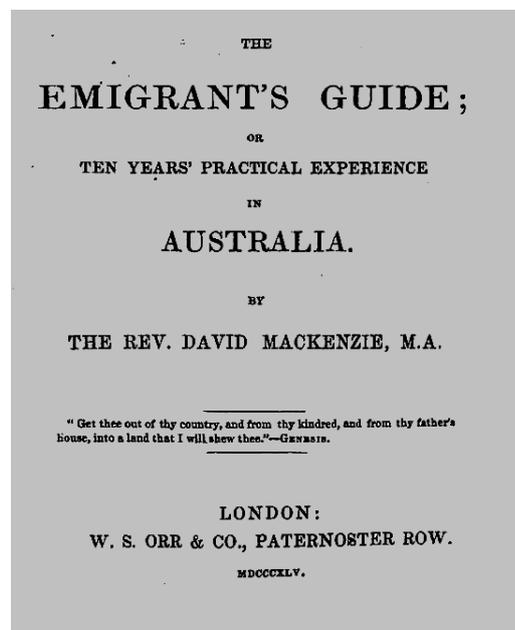
What's extraordinary is how some things have not changed at all. I have captured and presented some delightful extracts, under a few different topics for your perusal.

Politics

There is not much talent displayed among the members of the Legislative Council, and little interest is felt by the colonial public in their discussions. In general, their speeches are dull and Prosy. Each member wishing to have the extent of his patriotism and loyalty measured by the number of pages which his speech, when published, will occupy in the Sydney Herald. They contrive to keep each other in countenance by alluding to one another in such terms as " my honourable and learned friend,"—when it may so happen that this very honourable and learned friend can neither speak nor write half-a-dozen consecutive sentences grammatically.

Sydney housing

I have lately seen living, under an overhanging rock near Sydney, an old man, a native of the Emerald isle, who informed me that he had lived there for the last few years in order to save rint,



as house rent was too dear in Sydney, and that he enjoyed better health under the rock than he ever did in their fine houses.

Newspapers

If you happen to advance any opinion, or endeavour to establish any doctrine unpalatable to the editor, instead of attempting to refute or disprove by argument your statements, he immediately falls foul of yourself, abuses you personally, and if there is anything objectionable in all your past history, he rakes it up, and places it against your statements,—to prove, of course, that they are incorrect.

Fire prevention

Notwithstanding the carelessness and drunkenness of many of our domestic servants, we seldom suffer any loss by fire.

The Hume Highway

The third and last great road is that which leads from Sydney to Port Phillip. On all this road, measuring upwards of six hundred miles, there is little to be seen but gum-trees and public-houses. If you have seen a mile of it, you have seen the whole road from Sydney to Melbourne, the capital of Port Phillip. The only difference is, that as you recede from Sydney, the grass for your horses improves, in the same ratio that the accommodation for yourself becomes worse.

From the time you leave Yass, which is about two hundred miles from Sydney, until you reach Melbourne, a distance of four hundred miles, you are fairly in what is called the bush. In short, you are beyond the region of civilisation. On this journey of four hundred miles there is neither church, clergyman, nor schoolmaster. The consequence is, what might be expected, that a large proportion of the inhabitants are living like heathens.

Melbourne

Melbourne, which is beautifully situated in and on the sides of a valley, contains a population of about 7000. It has several shops, which would do no discredit to the most fashionable streets of the English metropolis. The town is on and watered by the Yarra Yarra, where that river flows into an inlet of Hobson's Bay. The houses are chiefly built of brick ; the streets are wide, straight, and cut one another at right angles.

To me it was truly delightful to witness the appearance of the town on a Sunday; the places of worship all well attended, the people dressed in their best attire, the shops shut, the streets quiet as in an English town, and no visible symptoms of riot or drunkenness. This moral superiority of Melbourne over Sydney I can attribute to nothing else than the comparative absence of convict influence.

Morals and society.

IF I had any selfish interest in advising you to emigrate to Australia, I would not say a single syllable about the morals or society of Botany Bay. But I have no wish that any of you should come here, neither have I the least inducement to conceal from you any of our moral deformities; and I must then candidly tell you that our calendar of crime is truly frightful, embracing murder, highway robbery, stabbing, arson, cutting and maiming, burglary, shooting and wounding, rape, piracy, perjury, cattle-stealing, etc.

You may then every two or three minutes hear thundered forth with the voice of authority from the magistrates' bench, " Six hours to the stocks —ten days to the cells—twenty days to the tread mill—fifty lashes (on his bare back) !"

Marrage

I have reason to believe that in some cases immoral acts in this colony proceed more from ignorance than from any preconcerted design. A remarkable instance of this kind was related to me by the Rev. Mr. H. In 1840 a decent looking couple, after the usual proclamation in his church, came to him to be married. It was afterwards, however, discovered that the bridegroom

had been through some accident detained at home, and that it was his brother who arrived accompanied by the bride and two or three of her friends. They waited a whole hour for the bridegroom, but never told the clergyman the real cause of their waiting. At last they stated they would wait no longer. My friend accordingly married them, and they returned home. When this irreparable blunder was afterwards discovered, the married brother, in the simplicity of his heart, stated that he thought he could transfer the young wife in the evening to his brother, the real bridegroom, whom he waited a whole hour, and that he "was unwilling to return home from the parson, after having come so far, without doing some business by way of securing the woman." I forgot to inquire of my friend the Rev. Mr. H., with which of the two brothers the blooming bride has since lived: whether it was with her real, or with her intended husband.

This is, I think, the greatest extension of "a power of attorney" that I have ever known given in this colony.

Transport

Everything here is done on horseback—every man you meet is on horseback. In the interior a boy will not travel from the hut to the stockyard except on horseback. A man will walk two miles to catch a horse to carry him one mile. A black fellow will not proceed fifty paces for you unless you lend him a horse to ride.

Industrial Relations

Never hire any man who will not consent to sign a written agreement, containing a clause binding him to make himself generally useful. All old hands have a mortal antipathy to this clause. But unless it is inserted in their agreement, it is evident that five hundred unforeseen and totally unexpected things may require to be done which they, if they choose, may legally refuse to perform.

Food

Nothing will more surprise you here, than the quantity and quality of eatables on the table of some of the old settlers at a cattle-station. In the course of one day I have seen the following on a table which consisted of a sheet of bark, nailed on four posts driven into the floor:—beef, pork, ham, vegetables, eggs, fritters, butter, cheese, tea, sugar, cream, damper, poultry, wild ducks, and fish fresh out of the river. ' No wonder, then, that some people here should occasionally complain of indigestion.

Smoking

everybody smokes: men, women, and children, white and black, all smoke. Every dinner, every supper, every meeting, here ends in smoke: about two years ago it was seriously apprehended that the whole colony was then about to end in smoke; when they are out of tobacco, the people will smoke anything and everything, tea leaves, etc.: they have been known even to smoke a passing stranger, who appeared to have some designs on them! I need not say more to prove that tobacco procures for you a cordial reception, and the best accommodation at every but you pass on your travels. In times of great scarcity of this precious weed, I have known 11b. of tobacco bought in Sydney for 3s., being sold in the bush for 20s. sterling, and glad were the men to get it on any terms.

Summary

In Australia we have no national debt to absorb our profits. Here we have no direct taxes, as in England, to keep the people's noses always to the grindstone—here we have neither tithes, nor poor-rates, nor game-laws, nor severe winter. In Australia we have no exclusive religion, no dominant state church. We have no quadrupeds dangerous to man. We have here the same laws, the same money, the same coins as in England. I never saw a spot or heard of a climate more calculated to restore debilitated constitutions. We enjoy the most delightful climate on the face of the globe.

The book is a fascinating read and it helps to get our own history into perspective. I'm sure it would have been responsible for many a Brit to take the plunge and leave their homeland despite the arduous journey. The full book is now old enough to reside in the public domain. It is about 7mb in size. If you wish to see the full text, I have added a copy of it to the bottom of the **GGREC Articles of Interest** web site under the **Downloads** area.

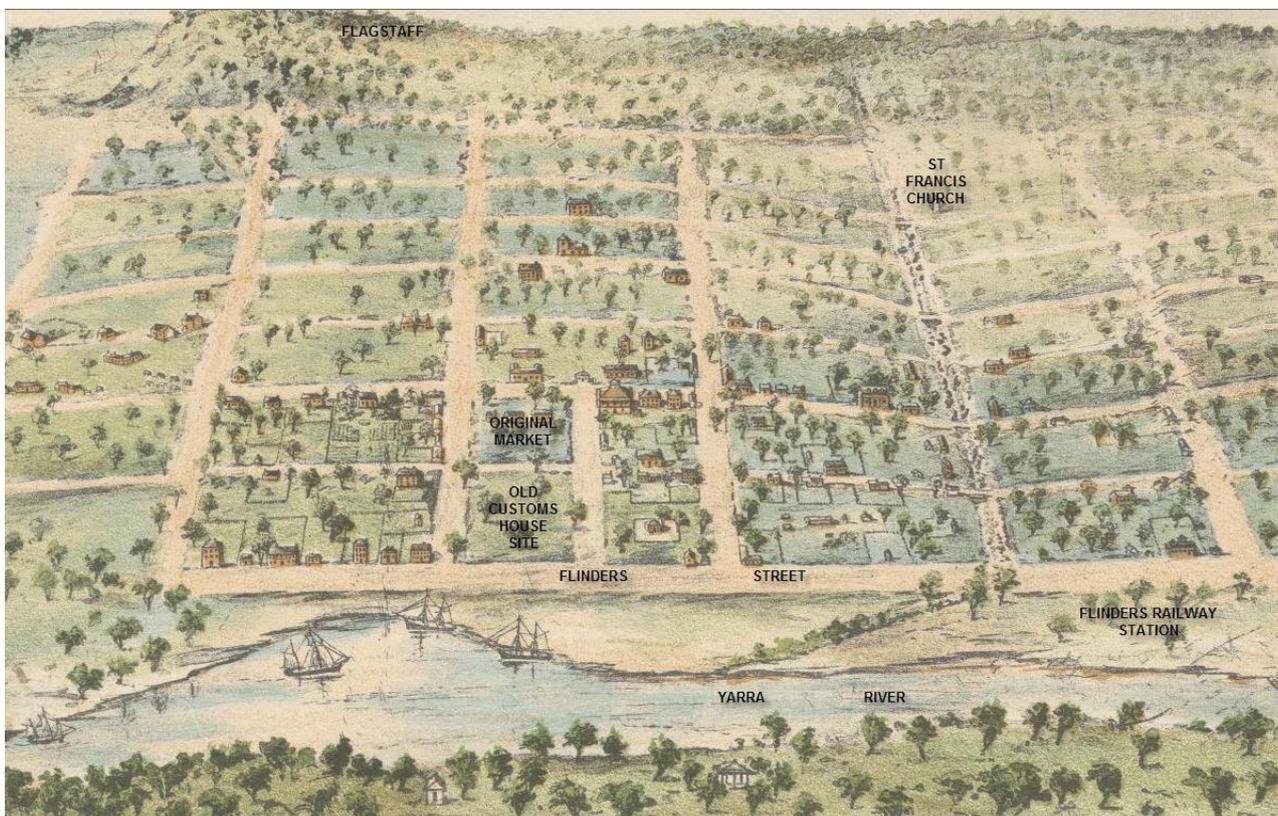
<http://ggrec.org.au/Downloads/Articles%20of%20Interest/>

The Jacksons arrive intact and in due course became my great-great-grandparents. They opened a pub in Sydney Cove, which is probably a reasonable thing to do. Some documents like ship manifests and letters from England survived to the present day, but details are scarce. I was told the bizarre story of how my grandparents met, where the bride to be worked at the Bryant and May match factory in Richmond, Melbourne and put small messages in matchboxes that went all over the country. One box made it to Gunnedah in NSW where husband to be got the matches with a message within. After a few months of letters bouncing back and forth, he came down to Melbourne and married her. I think its called matchmaking... Not many things would have to be different for somebody else's article to be in this magazine.



Another one of my ancestors was a dwarf called Dominic, who at 24 inches tall, joined the circus in the 1880's under the title of 'Smallest man in the world'. The pic here was taken in Bourke st. Melbourne. Had he been born today he could have got a job in 'Game of Thrones' or maybe even as an Oompa Loompah in *Charlie and the Chocolate factory*.

I don't usually dwell upon the past, but, it is too easy to only think of our country as it is today and not how it was. The book reviewed here paints a vivid picture of living at those times. Life would have been tough, but generally, those that came to Australia from a largely impoverished Brittain considered themselves the lucky ones. Still, the harder you work, the luckier you become.



Melbourne in 1838. Parking was cheaper back then

VK3RLP Repeater Repairs



The call went out, the repeater is dead, the repeater is dead – Long live the repeater.

Well if that call did Tx, all would be well, but it wasn't, as in no call was getting out. Looking at the front panel of the repeater, one could see it was receiving, but there was no retransmission occurring. At the same time the local monitoring speaker was also silent – no audio at all.

Now at the basic component level the complete repeater system consists of 4 parts, the repeater itself, a power supply, a diplexer, and the antenna. Along with several connecting cables that one should never forget, (the TX to diplexer cable being the last fault we had). Whilst the repeater appeared powered, was it receiving the proper regulated and filtered 13.80 VDC it was expecting, yes. (The second last fault was the power supply). Using the manual TX switch on the repeater caused no transmission, monitoring the power supply suggested no extra power for a Tx session was being drawn either.

So the repeater proper was removed from the 19 inch rack/cabinet it lives in and opened up on the club room bench. The repeater has 3 parts, a transmitter, a receiver, and a controller. On the back of the repeater the club has added two extra boxes, those being a sub-audible tone generator & a voice ident module – basically a digital tape recorder that plays ident messages.

The transmitter & receiver are basically identical Motorola Syntrx plus radio's. Whilst both are capable of either transmitting or receiving, they only ever perform the one function, never the other way around. I thought this rather wasteful, as basically half of each radio is never used. However from Motorola's manufacturing perspective, easier, as they can just drop in two off the shelf radios and all the RF functionality is sorted.

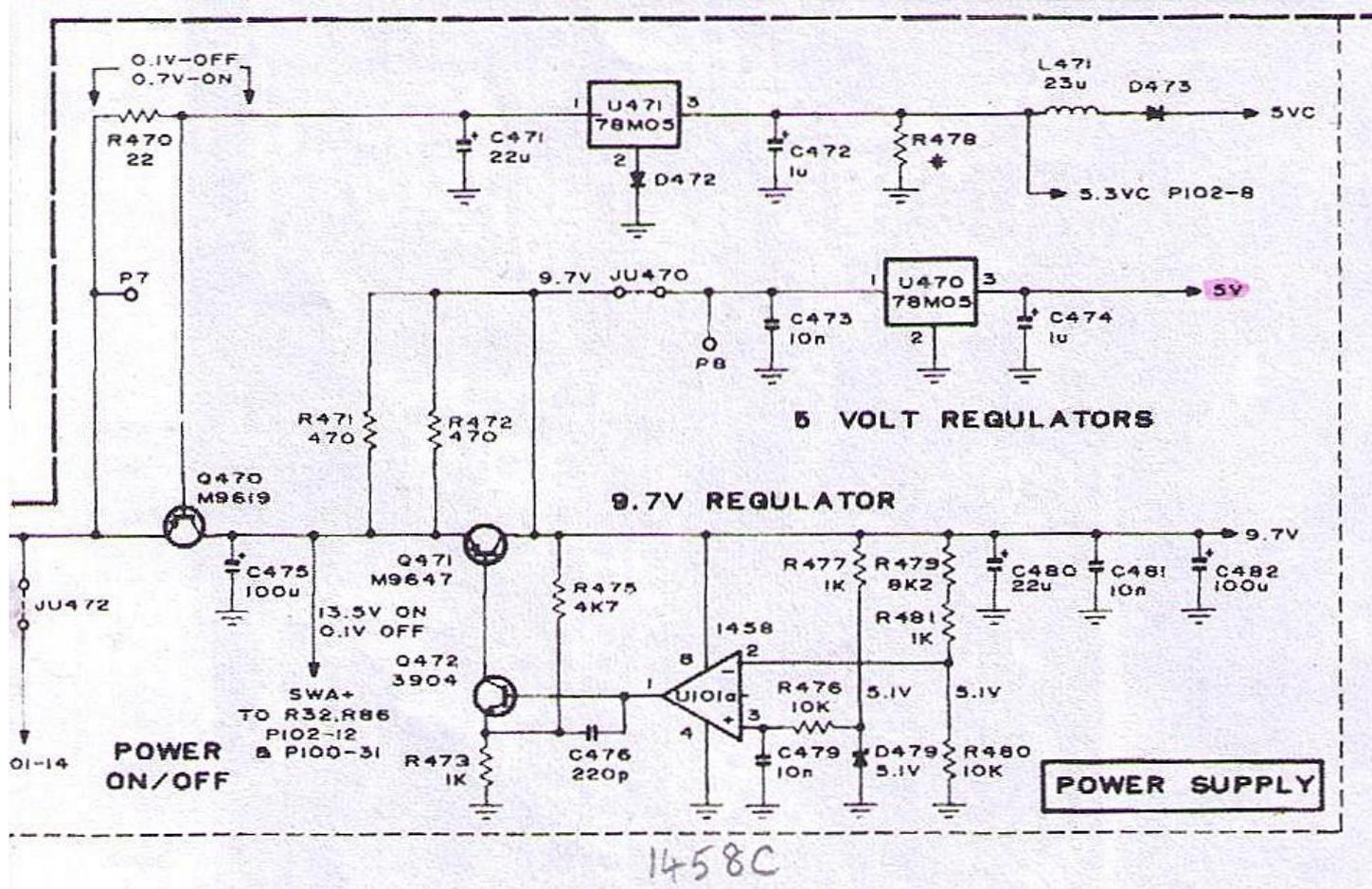
Whilst we appeared to have two faults, no Tx & no Rx audio monitor, I settled on the Tx fault.

On the Tx radio, the PTT function shares the same input pin as the transmit audio. On the controller a NPN transistor basically pulls the transmitter radio's PTT low. Trouble was the PTT line was only measuring about half a volt. Now it would be nice if the circuit diagram mentioned the voltages to expect here, unfortunately it didn't, all we could see as a guide was a pair of 220K resistors pulling that line up to 5V. Also unfortunately the circuit board overlay diagram had been photocopied poorly and you could barely read it. External pins etc. were ok, but finding resistors among the track work was another story. Bruno VK3BFT thought he had found one of the pull-ups, but I could not verify it with a multimeter, and that said resistor also did not have 5V on it, so I had my doubts. At that time it was getting rather late, so we called it a day, with Bruno trying to talk me into coming back next Friday.

The next day, I thought I'd do better on my own at home, so I went back to the club rooms and took just the transmitter radio home. I knew I had a Syntrix microphone, so I was hoping that would be sufficient to make the radio work alone, free of the repeater controller etc.

On my bench (the opening photo) the radio behaved identically to what was happening at the club rooms – this was good, as it indicated I had the faulty bit, and the fault was not back in the repeater controller, or power supply.

After much hair tearing and PCB track chasing, I found myself back at the same resistor Bruno had identified, he was correct (of course), not sure why the multimeter did not agree, maybe it was partly to do with my 54 year old eyes and surface mount components. One of the reasons I took it home was so I could spend time with magnifying glasses and no distractions to fully verify what I was looking at. I chased the 5V line back to a 3 terminal regulator, no output!.



This radio has two 5V regulators, one is always on, the other powered from a 9.5 V rail, which is switched by a transistor, driven from the microphone mounted power switch.

Obviously in the repeater this line is always switched on.

The 12V was getting through to Q471 but the 9.7V rail was down to about .8V, and the 5V regulator U470 was outputting about half a volt – just what I had seen on the PTT pull up resistor. Now this regulator circuit has one good twist, the output of the regulator powers the circuitry – the 1458 op-amp U101a, so if there was no output how could it then turn on Q472 & Q471 to start the whole process? the only hint was the two 470 ohm resistors providing a token amount of current that bypassed Q471. The resistors checked out, but with the given load, that was only 1V, not enough to bring up the op-amp and turn on Q472

The first thought I had was is there too much load either directly on the 9.7 V rail, or was there an excessive load coming via the 5V regulator, U470. If you look at the diagram, there is a link just for this situation, unfortunately the link JU470 is actually a zero ohm surface mount resistor. I don't have any SMD de-soldering tweezers in my kit, so I instead removed regulator U470. What, sucking out three plated through holes to remove a regulator is easier than pulling one resistor – in my case, Yes. You cannot just pull one leg of an SMD, unlike a leaded version.

It had almost no effect, so time for a different approach. How about providing my own 9.7V rail? So I set my bench supply to 9.0V and connected it across the 9.7 V rail. Why 9.0V rather than the full 9.7V?, well that way I can monitor the 9.7 V rail and easily tell which regulator, the Syntrx's, or my bench supply is doing the work. Surprise surprise the rail immediately shot up to 9.7V, and stayed there even with the bench supply disconnected. And guess what, when I did this with the 5V regulator re-installed, pushing PTT gave me 22W of RF, with mic audio.

The radio sat there for ages in this state, then all of a sudden the lights went out, no 9.7V.

I repeated this sequence several times, a mere tap of my 9V and the radio would spring into life, but for a somewhat random time, before going back to sleep.

So I started poking around with my oscilloscope, hoping for a hint, the best I could find was some rather erratic noise on the output of the op-amp, U101a. I was then drawn to C476, a



ceramic cap across the base-emitter junction of Q472, but as I was checking this I noticed the two electro's next to it didn't look the best. I had a sniff, it was a smell I'd experienced when fixing Philips radio's. at Telstra in the electronics lab in Carlton. They referred to it as 'nappy shit' smell, never having had any kids, I'll take their words for it. However when I applied my solder sucker, the heat made it 100X worse. So I kept pulling caps and quickly realised this set needed a complete re-cap.

This capacitor is one of the worst, it looks like is has a lime green sleeve on the negative leg, No that is leaking electrolyte and corrosion



The black gunk on the positive lead also had me worried.

Unfortunately I have seen this electrolyte soak right through a PCB appearing on the opposite side to that of the capacitor, And no in that case it wasn't via the plated through holes, I'm talking surface mounted capacitors here.

Once this stuff gets into a PCB its game over.

Whilst one can clean an electrolyte spills off the surface of a PCB, how on earth do you clean it from inside a sheet of fibreglass, the answer is you don't. – You just give in and throw it away.

The end result is lots of noisy and low insulation resistance faults, followed by disappearing tracks.



After several trips to Jaycar (Yes, one should have done, I just kept missing one) I ended up with this pile of dead caps, now only suitable for gracing the pages of this magazine.

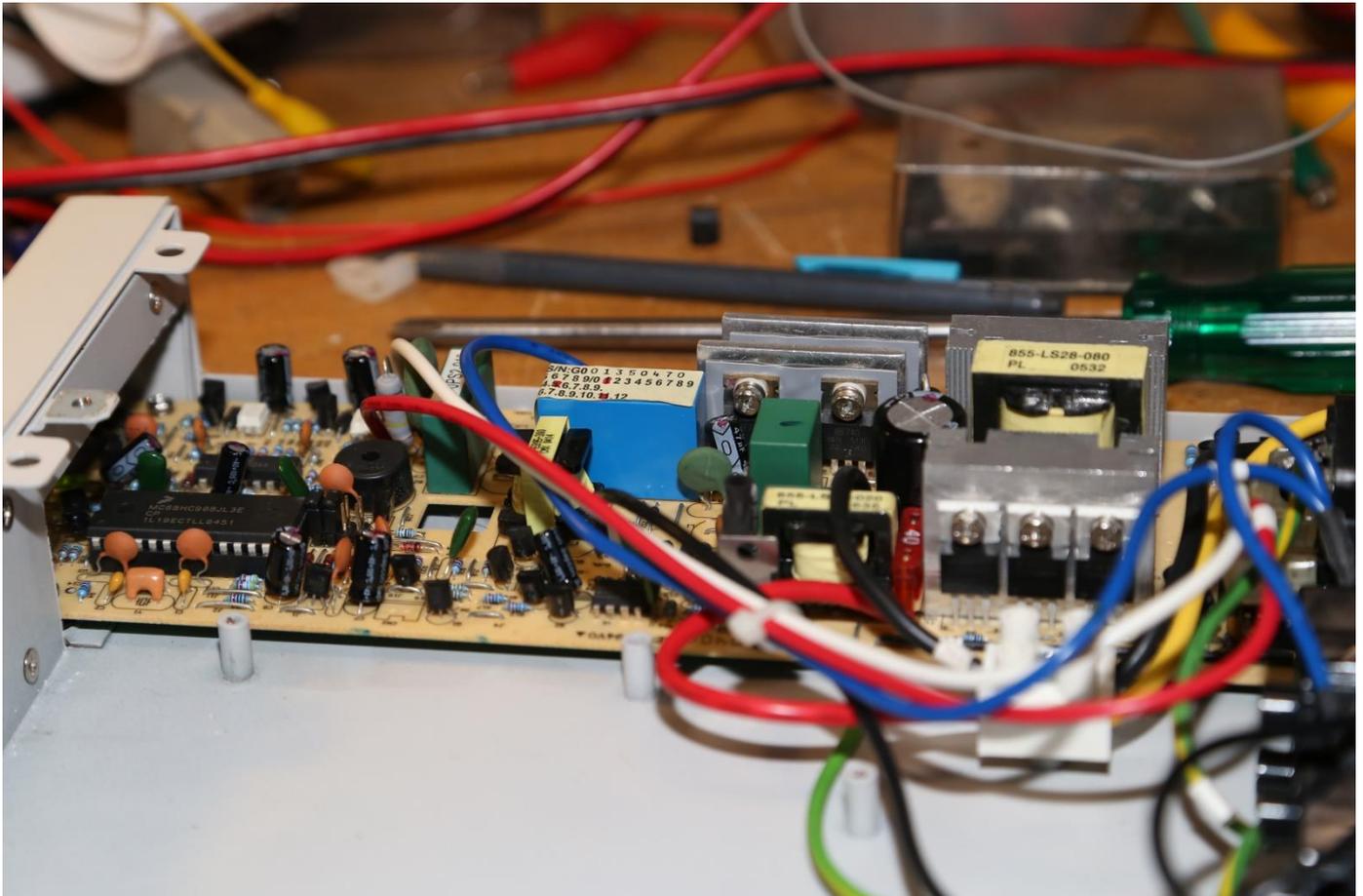
You maybe also be able to see the chip cap in alongside the pile, unfortunately Jaycar and Altronics seem to be getting out of SMD's, so I had to replace it with a leaded type.

So after a pile of isopropyl alcohol and cotton tips, most of the visible gunk is gone, but is this the end of the story, only time will tell, but I would not now count on this radio living all that long, it's on the final slippery slope to radio hell. At least it now smells like a radio.

I can think of one reason for all the leaks – Heat. A typical two-way radio at most has a 50/50 duty cycle, this one, especially during the 10:00 net is coping over 90% duty, and on a hot day I'd hate to guess a temperature – so next job on this repeater is a fan. Why Motorola never fitted one I'll never know. ***So anyone for a new digital repeater?***

Paul VK3TGX

Playing With UPS's



Or should it read **“Trying not to kill myself with a UPS”**

For a starter, some background on UPS's, also known as 'standby power supplies'.

Of course the whole point of these devices is to ensure the load plugged into the back is not allowed to lose power. Usually the load is some form of computer – a file server/workstation or a NAS box (Network Attached Storage), or maybe even a security video recorder.

The type most often seen, whilst referred to as a UPS, or “Uninterruptable Power Supply”, the actual more technically correct term is a “Standby Power Supply”, because the load is connected via a relay directly to the incoming 240V mains power, the UPS's internals are almost in standby, only monitoring the mains for any problems & charging the internal battery. When a problem in the mains is detected, the UPS starts up its 240V inverter and the relay swaps the load from the mains to the inverter, effectively running the load from battery power.

With a 'true' UPS, the 240V inverter is always running, and the load is always connected to it. Of course the 'battery charger' (DC power supply) in the UPS is a lot larger, as it has to both charge the battery and keep the inverter running 24/7. With this setup, when the mains fails, no switching is needed, the load stays put, however the DC power is now flowing from the battery rather than the now inactive DC power supply.

With the cheaper standby model, there is always a short break in the power as the sense circuit has to respond, start up the inverter, and finally the relay has a switching delay. The whole setup relies on the loads power supply being able to handle this brief blip. Usually it can, but the length of the blip & the abilities of a given supply to handle this break are rarely documented – one usually just crosses their fingers and says “She'll be right mate”

If your computers power supply is very conservatively rated, then you'll fare a much better chance than with one running close to its full load spec. Another thing to keep in mind is the age of the power supply, all that's saving you is the main filter caps in the supply, as they age their abilities diminish. Hence the 'big boys' with deep pockets go for a true UPS and never have to worry that blip. Similar units, with no battery also serve as HiFi power conditioners etc.

And now for the scary bits. UPS's are in general quite a dangerous device, to safely work on them you have to disconnect both the battery & the incoming mains. But hang on a bit, debugging a power-less device is rather difficult! So one power's it via a 240V isolation transformer, better, but that battery, that usually must be connected for the thing to work at all (UPS's will generally stay 'off' with no battery present) is just waiting to bite. 12V, or 24V DC is in itself not bad, but any accidental shorts will quickly bring on over 100A, with burnt/smoking wiring and hot metal flying towards your eyes. Then when you least expect it, the inverter will kick into life and give you a high voltage kick, one with plenty of amps.

Years ago when I worked for Telstra we had these true UPS's that had 16 x 7AH 12V battery's in series, giving about 200VDC, any slip of the test probe and you had a DC arc that was all but impossible to stop. It just kept burning till all the PCB tracks were gone! Then for good measure the 200V was stepped up to 400VDC to synthesize 240V AC, mind you that AC was a true sine wave, with less the 1% harmonic distortion, the best power a load probably ever saw.

In the past, one had to deal with live chassis TV's & radio's, thankfully this is all a thing of the past – a way for manufacturers to save some money by leaving out the power transformer. I thought I'd never see this again – Till the UPS at the top of this article. There is no isolation between the mains and the 12V battery that normally lives in there. The incoming 240V mains is rectified into DC, the negative of that rectifier is connected directly to the battery. meaning you can measure about 120V AC & Negative peak 340V DC, combined on that 'nice and safe' 12V battery. If you look at the PCB all one sees is what looks like a normal switch mode power supply, usually these things are isolated – in this case WRONG!

A while ago, Graeme VK3XTA handed me a largish rack mount UPS, that used 48VDC from 4 x 7AH 12V battery's. It also had a connector on the back panel for an accessory external battery pack for longer run times. Same story, all this was LIVE to the mains. Their solution was to fit a high voltage DC connector to the back panel – what a poor substitute for some proper isolation. Did they save any money? It can't have been much.



If one looks around on the web, searching for "UPS hack" you'll find several stories about modifying a UPS, in this case to extend the 12V battery out to run DC loads

<https://www.youtube.com/watch?v=-Ur-D37-juo>

If you want to go down that path then make darn sure you don't have a live battery. Ideally you should be able to measure zero ohms between the negative of the battery and mains

earth. (Assuming a Negative earth design). If you can't I'd be tossing that one into the bin.

Do the world a favour, don't sell in on eBay etc., strip it and chuck the carcass into the bin.

Usually, but defiantly not the rule, if it has a large iron core transformer in it, it's probably isolated and safe. Don't assume anything thou, TEST IT!

One thing to remember, on these small 12V UPS's, the 12V battery charger fitted to them is usually quite lowly powered, it only has to do a bit better than float charge the battery, so hooking up an external 12V load (assuming it's safe) will probably only stuff your battery!



<https://www.youtube.com/watch?v=VM7bLJ-oV84>

Another hack to be found on the web is hooking up external batteries to an old UPS. This one I found was a bit of a fluke to me, as it's basically the same UPS as two others I am also looking at modifying in the same way.

These APC made units normally contain two 22AH 12V battery's – unfortunately buying them is a very expensive proposition, so the only economical fix is to run an external battery box, using cheaper battery's,

maybe from the last hamfest, assuming one can trust those selling the battery's. Not that the folk selling them are necessarily dishonest, it's just that if they've been left in storage for a while they can easily be far worse the wear than the seller could possibly imaging.

I tested my APC 1000XL, and found a very healthy connection between earth and the battery, and unlike the model in the YouTube video, mine has an Anderson powerpole DC socket on the back panel, I don't even have to remove the lid to connect the external 24V battery pack.

The only problem with these models is they are somewhat more greedy when it comes to the power drawn from the mains – to basically float a 24V battery. One would assume a few watts, but I measured ten times that amount.

So if I have these nice (albeit inefficient) UPS's, why am I playing with that death-trap in the first picture? 12V is the answer, Like most amateur operators, I live in a 12V world, 24V is a right pain in the I could spend forever and a day modifying one of my APC UPS's for 12V operation, (I'd have to rewind the power transformer for a start) it's probably going to lead me into so many problems that it will turn into "The never ending story"

If you take the full spec of that 1000XL UPS, as in a 1000W load, that's at least 42A, assuming a 'perfect' 100% efficient design, it's probably going to be more like 50A+, so I can forget trying to step up my 12V source to 24V, as that would be like 100A at 12V – this is getting serious.

I did manage a fiddle on the death-trap UPS, but all that is keeping me safe is a set of change over contacts on a relay, yes, I now have a solid earth strap in place, and if the relay should fail in the worst possible way, that will blow the mains fuse, and probably trip the houses earth leakage breaker (safety switch) but I kind of don't want to rely on them, I want the safety in the box. Maybe an extra interlocked relay that switches the mains right past the circuit board might make me feel more comfortable.

After all, I've gone to the trouble of installing solar power to be 'green', why waste the advantage to a low efficiency iron core transformer, just so I can ride through a power outage, mostly caused by extended hot weather and current day man's obsession with having air conditioned houses. (set to 20C)

Paul VK3TGX

Australia Day



More photo's at http://ggrec.org.au/gallery/categories.php?cat_id=257

Meeting 19/01/2018



News, views and interest items

G'Day everyone,

As we move into 2018 we plan to release a monthly news broadcast, via email, our website, social media and the major Amateur Radio News services.

Importantly, we'll present a monthly Intruder Watch update. We'll tell you about what's happened in the previous month, what trends we're seeing and what actions have been taken.

We need your input; so don't forget to report any intruders via our IW Service.

<http://vkradioamateurs.org/intruder-watch-service/>

In the meantime, here's some news from far and wide that should be of interest.

Intruder watch – it can work

As discussed previously, the IW system can work if amateurs are proactive. A report in 2015 of an Australian Government intruder in primary amateur spectrum was followed up directly with the ACMA, and the intruder was moved.

Recently, the local 70cm repeater in Albany WA suffered interference from a ship in port.

Merchant ships often use UHF portable radios for berthing/unberthing and cargo operations. Unfortunately, the UHF radios on the ship in question just happened to be on the repeater input frequency....

Local amateurs contacted the port control, who instructed the ship to change channel, and the problem was resolved.

Well done to all involved – this is a great example of amateurs solving interference problems by direct action.

Obviously, the chances of a ship being on the repeater input frequency were very remote. However, the ship was operating illegally, as although amateurs are secondary in the 70cm band, marine services are not permitted.

This whole problem is a consequence of the generally very poor regulatory oversight of ships these days.

There is no need for ships to use 70cm, as the ITU has allocated six UHF channels specifically for intra-ship comms – these are:

457.525, 457.550, 457.575, 467.525, 467.550 and 467.575 MHz.

The first three can be used in conjunction with the last three for repeater operation if desired (i.e. a 10 MHz split).

RASA Survey Update

Thanks to everyone who responded to our survey about "Amateur Radio Regulation – Your Knowledge". We've had a tremendous response and have now closed the survey. Preliminary results will be released in the coming few weeks and we'll also be using the findings to help us guide the organisation. Stand by for more news.

60m Activity

In recent months, two new shortwave broadcast stations have popped up close to our 60m allocation. Aside from a great selection of Australian music, many amateurs have been tuning in to get a sense of propagation on this band.

5045kHz AM

<http://www.ozyradio.com>

5055kHz AM

<https://swling.com/blog/2017/04/4kz-more-info-about-australias-new-shortwave-broadcaster/>

RASA is working on plans for radio amateurs in VK to gain access to this band. In the meantime, some 60m news from our friends across the ditch; proving that with some careful and responsible planning it is possible to gain access to new bands.

<http://www.nzart.org.nz/info/60m>

DXpedition 3Y0Z Bouvet Island canceled.

The long-awaited DXpedition has unfortunately been canceled. Read more here.

<https://dx-world.net/3y0z-bouvet-2018/>

Digital Modes – the way of the future? An exciting new mode.

If you haven't yet tried digital modes maybe 2018 is the time to try. FT-8, in particular, is getting a lot of interest. It also provides a fascinating insight into propagation and weak signal reception. One VK convert refers to it as "face paced" and a great mode to overcome high noise levels and limited space for HF antennae.

<http://www.arrl.org/news/mode-usage-evaluation-2017-was-the-year-when-digital-modes-changed-forever#.WmpuyyBgUl4.facebook>

We'll have more details and real-world stories on FT-8 in coming weeks and months.

Check in on our website for more up-to-date information. And don't forget to send us your IW reports. We need your help if we have any chance of addressing the intruders on our bands.

73 from Andrew VK6AS, Chris VK3QB, Ian VK3BUF and Glenn VK4DU



**The Radio Amateur Society
of Australia**



Club Information



Meetings 2000hrs on third Friday of the month at the
 Cranbourne Guide Grant Street Cranbourne
 Prac nights first Friday in the Peter Pavey Clubrooms Cranbourne 1930hrs
 Visitors are always welcome to attend

Office bearers

President	Ian Jackson	VK3BUF	Web Master	Mark Clohesy	VK3PKT
Admin Sec	Michael Van DenAcker	VK3GHM	Magazine Editor	Paul Stubbs	VK3TGX
Treasurer	Chris Chapman	VK3QB	Property Officer	Bruno Tonizzo	VK3BFT
General 1	Mark Clohesy	VK3PKT	Secretary	Ian Jackson	VK3BUF
General 2	Ron Lacey	VK3FRDL			

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 VK3RLP In 434.475MHz Out 439.475MHz CTCSS 91.5Hz
 VK3RLP 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

- Pension Member rate \$25.00 Extra Family Member \$20.00
 Standard Member rate \$40.00 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 at each April Annual General Meeting.

Magazine Articles to editor@ggrec.org.au or vk3tgx@gmail.com Cut off, 10th
 All other Club correspondence to: secretary@ggrec.org.au
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