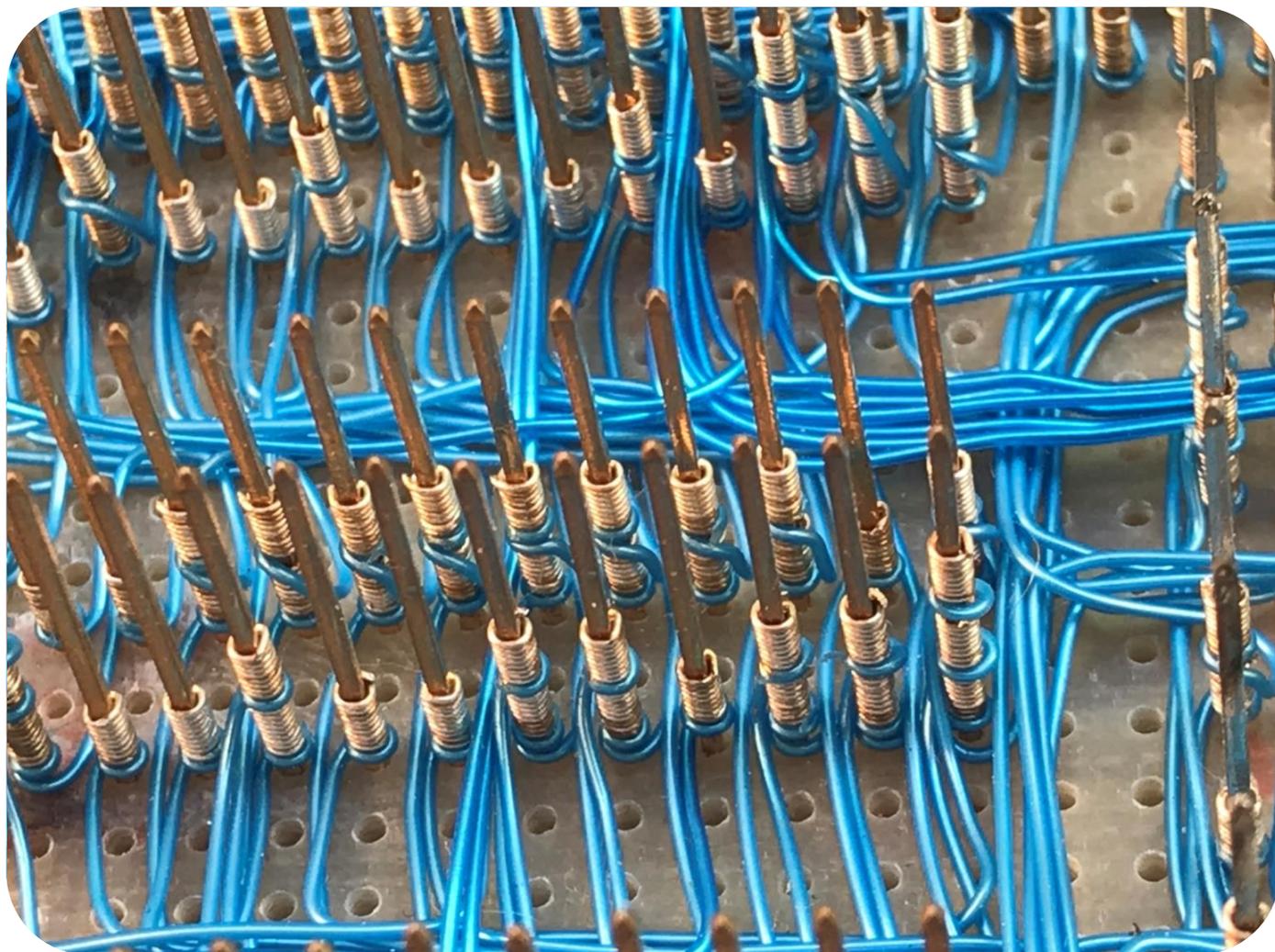




# GATEWAY

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

**September 2020**



**One Man's view on SDR**

**Vale Jenny (and Reg)**

**Vintage Computing, pt 2**

**And More**

Cover photo, Wire-wrapped circuit board – see page 13

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Note: - club meeting minutes are on the club website

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## Event Queue

### September:

- 18<sup>th</sup> General meeting – 8:00, [Via video link, see club emails](#)
- 19<sup>th</sup> O E SOTA day, Austrian SOTA Association – courtesy WIA

### October:

- 2<sup>nd</sup> Prac/Natter night, [Via video link, see club emails](#)
- 3-4<sup>th</sup> Oceania Contest, Phone: 06:00 - 06:00 UTC, Sat to Sun (24Hrs) – courtesy WIA
- 10-11<sup>th</sup> Oceania Contest, CW: 06:00 - 06:00 UTC, Sat to Sun (24Hrs) – courtesy WIA
- 16<sup>th</sup> General meeting – 8:00, [Via video link, see club emails](#)
- 24-25<sup>th</sup> CQ WW DX SSB – courtesy WIA

<p style="text-align: center;"><b>Club run events are only possible with the involvement of ALL members. Without volunteers to coordinate and participate in club events the club will fail to prosper</b></p>
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## President's report September 2020

This is my first missive as President. I would like to firstly say thank you to the previous committee who did a great job in difficult circumstances. They kept the club running for longer than they were required to until we could have an AGM. Thank you and well done.

Members - I hope you are all doing well and coping with the lock down, if you are in one. Remember that other members are only a phone or radio call away. There is the regular coffee chat on our RGW repeater each morning at 10am. Hopefully with the numbers dropping, all be it slowly, we will be out and about soon.



Since the GM & AGM last month the new committee has been working with the old to do the transfer and transition so that we can continue on managing the club. This should be now completed with perhaps the odd thing here and there that we haven't thought of yet.

The committee has had their first Gmeet committee meeting to get their head around and think about what we are doing going forward. We are aware that we may not meet face to face for some time still. We are thinking about how to keep the club connected. So if you have any ideas please email the [committee@ggrec.org.au](mailto:committee@ggrec.org.au).

We can still connect via radio – as mentioned above and various other frequencies (see the back page), internet – Gmeet meeting on the first Friday of the month and the General meeting on the third Friday of the month. Our wonderful magazine which Paul 'tgx' will still produce. Please send any articles to the committee.

On the first Friday which is our tech night we intend to discuss various new or interesting technical topics. To lead into this an email will be sent to members with some "homework". This maybe a short video, an article or a pod cast. Look out for it.

JOTA/JOTI has been cancelled for this year. Let's see what happens next year.

We are planning for the GGREC Hamfest to happen in 2021. The people that have booked tables and paid for them have told us to keep their booking so that is positive. Watch this space.

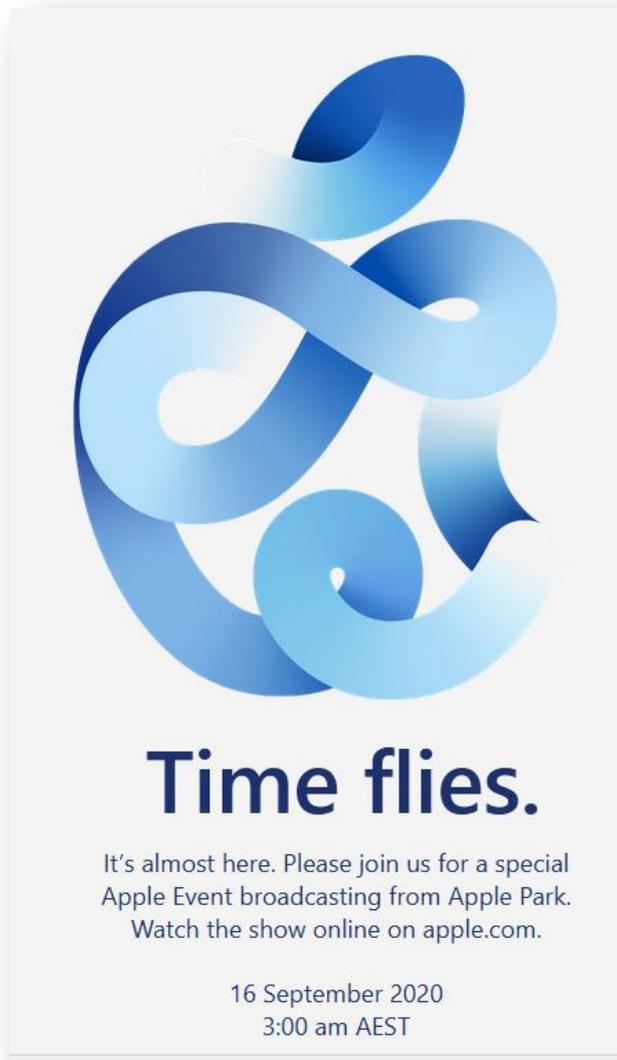
I hope as the incoming President and committee that we can generate some interest and fun whilst playing radio and electronics and have a few social gatherings whether they be virtual or face to face.

This was a bit more verbose than I wanted it to be but I did warn you at the start 😊

Michael

Gateway is the official journal of the Gippsland Gate radio & Electronics Club.  
It is published in good faith for its members and other interested parties. The articles here in do not necessarily represent the views of the committee or the membership.  
Any material that may be copyright has been included with permission where available.  
If there is an issue with copyright please contact the editor

## From The Editor



Last week I received this 'invite' to the next Apple product launch, which I found a pleasant surprise. In normal times, invites to Apple events are hard to come by, as they are only given out to select media etc. However in the current Covid19 era, this like so many other functions has become an on-line only event. So in reality they have probably pumped out a few million or more of these emails. A fact I am quite happy to overlook.

I like watching these Apple presentations, I crank up my subwoofer etc. as they usually show a few video clips etc., that have probably cost a small fortune to produce.

If my computer desk is not vibrating, something is wrong!

Apple is often criticised for over-priced junk, however my experience has usually been positive, the only problem with these presentations is the time difference between here and America – usually meaning sitting up at some ridiculous time in the morning/very late night. – depending on how you look at it.

As for product price – it was discovered years ago that pricing your product too low is about as bad as pricing it too high. If it is too low then

your product is seen as 'cheap', and then you are competing with all the cheap brands for sales, not the other higher end producers you wanted to go up against. You'd think that would lead to great sales volumes, far overcoming the lack of product price, but time has proven that idea to be wrong. So while I cannot probably afford any of their devices, I still like watching what they are up to – they did kick-start the whole smart phone industry, and they are far from dead.

On a more local note, welcome to the new line-up at the top of the GGREC, I was pleasantly surprised to see the AGM go through as smoothly as it did. I'm back on the committee for a second go at it, the last time was back when Peter Pavey was president, and the committee met at his house in Tooradin. In those days we were only asked for two things, 1/ where are we going for our next (camping) trip, and, 2/ who can we invite to give a talk at the next meeting. I was fairly useless at both these tasks, so I quickly bowed out when my time was due. I did buy a caravan to 'get with it' camping wise, however that didn't happen to many years later. Unfortunately the club is far less active on the camping front these days – more or less limited to Antennapalooza events that Ian VK3BUF (Thanks Ian) puts on every so often.

So hopefully when we get past Covid19, and I fix my 'van we can hit the road again.

*Paul VK3TGX*

## Jenny (and Reg) Goddard



During the 90's the Club was thriving with the introduction of many new members gaining their Novice Licence which was sort of a forerunner to the Foundation Licence.

Of those who joined the Club, Jenny and Reg Goddard made their mark as very active members.

Reg had the callsign VK3VRG and advanced to VK3UK several years later. The callsign was well suited as you could guess. He and Jenny were a complimentary pair and were the source of many good laughs at social outings and meetings. It was a full time partnership for sure.

To say they drove members to strive for better was an understatement because anything they had a part in organising was sure to turn out good. Along with raffles to raise money and Reg taking positions on the Committee, their names were always on the list to be thanked for their hard work.

Unfortunately time marches on and our members become older and unable to do the hard work and so they both sat back and enjoyed the results of their work until one day an unthinkable event happened and they had to move to retirement quarters in Donvale which made it difficult for Reg to keep up his radio activities.

Reg passed away in 2018 leaving Jenny to remain at Donvale until she too gave in to her age and passed away in August recently. Watching Jenny's funeral service online, although not the same as being there, was a good celebration of her life and marks the end of an era for me.

Watching the service I learned one or two things about them both that had escaped me while they were alive, but I think I knew them very well for the time they spent with the Club. Thank you to both of you. You are a part of my and the Club's history.

Vale Jenny and Reg, (I bet Reg is asking for his cuppa tea again Jenny)

Albert VK3BQO

# *One Man's view on how Software Defined Radio (SDR) came about.*

## **Prior to SDR**

### **AM and Short Wave Valve Radios**

Prior to the advent of Software Defined Radio and particularly during the late 1930s most valve AM broadcast radios were manufactured locally and therefore had their dials clearly marked with station call sign identification, making it easy to find your favourite radio station. Refer to Fig 1 Some even had press button tuning, particularly car radios, or dialup station facilities like the Astor Aladdin mantel radio of 1938 with Presto Tuning rotary dial (read telephone dial) facilities.



Fig. 1

But what about short wave stations? As we all know, not all valve radios were capable of receiving Short Wave stations, but those that did were usually divided up into shortwave bands (SW1, SW2, SW3 etc). Some of the high end radios did have dial station identification, at least for the major short wave stations. For example, BBC England, Radio Berlin and Radio Luxemburg readily come to mind. Short Wave radios were particularly popular amongst displaced Europeans coming to Australia after World War II. Kids like me and many others got great delight listening to stations on the other side of the world.

### **Transistor Radios**

With the advent of transistors, radios certainly became lighter and more portable. And in many cases a lot more sophisticated. This led to consumer radios with support for both AM and Frequency Modulated (FM) stations. However, transistor radios were now being churned out by the millions in select countries like Japan for the world market and this led to dials only being marked in frequencies and bands, rather than their call signs. This made it harder to find stations, unless you knew where to look. The upside to all this was you could now buy portable light weight take anywhere AM, FM radios that often supported shortwave stations as well. See Fig 2.



Fig 2

### **The Introduction of Television in 1956**

By now the average consumer wasn't that interested in shortwave stations anymore, as the world had moved on and radio cabinets that once took pride of place in the lounge room were now confined to the garage or being dumped, as television was the new boy on the block so to speak. And the ABC and SBS

TV, in particular, catered very well for immigrants who wanted their daily fix of world news. If you were a diehard shortwave listener you could still, however, buy a dedicated World Radio supporting AM, FM and most of the shortwave bands. See Fig 3.



Fig. 3

### **The role the Military and Spy agencies played in the development of SDRs**

Behind the scenes in the backdrop of the Cold War most countries were looking at ways of encoding, decoding, scanning the bands and direction finding all radio transmissions, on land, in the air and under the sea. During the war encoded morse (CW), Frequency Shift Keying (FSK) and other digitally encoded signals were used on various frequency bands to send both voice and written messages. For example Very Low Frequencies (VLF) was used to communicate with submarines at sea as this was the best frequency to use underwater. Direction finding equipment usually mounted in vans with rotating antennae mounted on the roof and in conjunction with scanning radios were used to find illegal transmitters, often used by spies and underground forces alike.

After the war it became apparent that scanning radio receivers had their role to play to identify transmissions, but what was really needed were Spectrum Analysers that could show any radio signal, along with its amplitude across the whole radio electromagnetic spectrum and in real time. These sets may have started off using traditional front ends to pick up the signal and then display the results on a screen. But as computers became cheaper, smaller and more powerful the received signal was digitised and purpose written software was used to filter out any unwanted noise, demodulate the signal and show the results on a PC monitor screen. This led to the birth of Software Defined radio (SDR) as we know it today.

### **Commercialisation**

Commercialisation of SDR soon followed. For example businesses specializing in tracking down interference to their installed transmitters, or Government agencies, such as the Australian Communications & Media Authority (ACMA) use it to help track down interference or to monitor the airwaves for illegal unlicensed transmitters. SDRs are especially useful in finding interference that is not fixed or stable and is drifting across the band.

## The role that Amateur Radio played

After the war a lot of surplus equipment became available and found its way into Army surplus stores as they were then known. Equipment such as Transmitters, Receivers, Antennas Morse keys, headphones teleprinters and the like were snapped up, modified and used on the amateur bands.

Amateurs also bought kits or made up their own receivers to tune across the bands in search of radio action. These early valve radio receivers, could usually



Fig 4

tune into Analogue Amplitude modulated signals, Single Sideband (both upper and lower), and Continuous Carrier (CW). See Fig 4.

Another form of transmission popular amongst some amateurs is known as RTTY (or Radio Teletype). It originally used surplus Teleprinters to send printed paper text messages using the Baudot code and Frequency Shift Keying (FSK) at around 60 words per minute to other amateurs when hooked up to a transmitter. Today with the advent of PCs the teleprinter can be emulated in software and the Sound card can be used to generate the frequencies that represent FSK. Usually an external box is used to automatically key up the transmitter and transmit the FSK signals.

Over the years this has led to an explosion of different digital signalling techniques to send text. For example AMTOR, PACTOR, G-TOR, HF PACKET, all use FSK signalling techniques. PACTOR II, CLOVER, PSK31 all use Phase Shift Keying (PSK) and HELLSCHREIBER, MT63, THROB and MFSK16, FT8 use DSP for keyboard ASCII code use.

All of these different methods have their own advantages and disadvantages when it comes to speed, error correction, less susceptibility to interference, what radio bands we intend to use these signals on, over what distances, what additional equipment we may need and whether we have to pay for the software or not just to name a few.

Even commercial and amateur radio voice modes are digital these days. For example DSTAR (ICOM & Kenwood transceivers), DMR (TYT and others), and YAESU (Fusion).

## Summary

Now here comes the dilemma, what sort of receiver is capable of receiving all these different types of signals and demodulating them? And the answer is of course, a SDR.

With the right software we can have a virtual radio or radios operating on the screen and use it to pick the band we want to listen to, switch in and out filters if need be, tune into a specific frequency and choose the correct mode of reception. For example AM, FM narrow or wide band, SSB, CW or the correct digital mode and demodulate it.

In addition to the virtual receiver we also have a Spectrum Analyser to view the whole spectrum or only parts of it and we can use the mouse to click on a particular signal of interest. Even the shape of the signal helps us to determine what type of signal we are looking at. For example an AM broadcast signal will be a trident shape with one big peak in the middle representing the carrier and the upper and lower sidebands either side of it.

We also have what is known as a waterfall display showing different colouring indicating where most of the signal power is distributed. As signals are constantly changing, the top of the waterfall represents the signal as of now and the bottom of the waterfall some time ago. This is helpful as there may not be anything being transmitted now but there was a few minutes ago at this particular frequency. If this was a text message we could see what text is being received now and what the text was being sent earlier, simply by clicking on that specific part of the waterfall. Again the waterfall itself can be used to help determine what sort of signal it is by its shape and colouring and how wide it is.

Because some digital signals often look and are similar to one another, some software packages even label the signal, for example, with the words DMR, CW, RTTY, PK31, FT8 etc, on the waterfall itself.

But wait there's more as most SDRs also have an audio spectrum analyser. Here we can widen or broaden the receiver's audio bandwidth, or move the bandwidth window to the left or right to lessen adjacent interference to the signal. With experience the sound of a digital signal is a clue as to what sort of a signal it is. Russian military encrypted signals sound like a *woodpecker* and "*Chinese Over The Horizon Radar*", also has its own distinct sound.

As it is all PC based we can even save the received signal to disk and call it up later, at a more convenient time or save our settings for future use.

It is also worth noting that some modern day encrypted digital signals use what is known as frequency hopping techniques within their allocated bandwidth. So rather than one carrier, thousands might be used, all at different frequencies. So again a SDR comes into its own.

In later parts of this series we will look at some of the hardware SDR options available to us. We will start with an older style SDR PC card, and then move on to using a TV USB plug in dongle to create a cheap SDR. This will be followed by commercially available plug in SDRs and Hybrid Amateur Radio Transceivers based on SDRs. And of course we will look at the software required to get everything up and running and from where to download it.

Author

Bruce Williams (VK3BRW)

# WICEN Calling

The 'other day' the club received an email from WICEN, it was a link to a questionnaire asking if our club would like to join – well it's more up to the members, and the sort of thing that would normally be put to members at a regular meeting – so I scraped most of the content from the 'SurveyMonkey' website, and converted it to a text file for you to read here. (Their spelling!)

If you are interested in WICEN, I'd suggest you contact them directly.



## WICEN Victoria and Amateur Radio Clubs in Victoria

WICEN Victoria is currently undergoing an organisational review looking at its future, the future of Amateur Radio with regards to its use in the response and recovery phases of an emergency and the delivery of service to the community as a public safety communications service, such as the existing motor bike and car rallies we currently support.

- 1. Would your club be interested in learning more about WICEN Victoria and the communications support we provide to public events?*
- 2. Does your club have an interest or desire to be involved in public safety events in and around your community?*
- 3. Would your club benefit in offering your members the opportunity to be involved in public safety events such as car and motor bike rallies?*
- 4. In the event of a large public safety event WICEN Vic may need additional radio operators. Do you see interest in your club providing members in support of these community events?*
- 5. Does your club have members who have a strong interest in SOTA (Summits On The Air) activations?*
- 6. In the future to provide radio operators for public safety events or surge and fatigue operators at a large scale emergency event we need trained and dedicated operators. Could you see your club being an auxiliary arm of WICEN? In that training comes to your club and members who are certified have the opportunity to offer their time when called upon?*
- 7. WICEN Vic is looking for ideas and suggestions to facilitate its relevance and grow its charter within the Amateur Radio community, in having trained & dedicated radio operators when called upon to serve. We value any additional feedback you may have.*
- 8. Is there anyone else in your club we should send this survey to whom you feel should contribute?*
- 9. Would you like a representative from WICEN Vic to make contact with you about facilitating and exploring how WICEN Vic and your club can work more closely together?*

Powered by



See how easy it is to [create a survey](#).

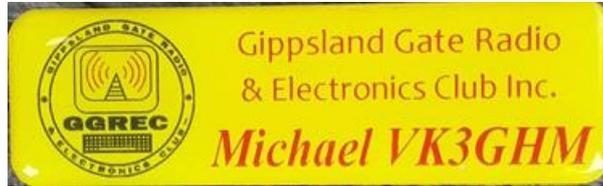
[Privacy](#) & [Cookie Policy](#)

# GGREC Name Badges

Originally an email to members, edited for here – Check your email

Hello to all our members from your GGREC Secretary Bruno Tonizzo VK3BFT.

If you are new to the Club and looking to obtain a name badge please email the [secretary@ggrec.org.au](mailto:secretary@ggrec.org.au) and I will add you to the list. The high quality name badges are available for \$13.00 each. Please pay by direct deposit and include your name or callsign so that we know who has paid



## GGREC Membership list

From time to time we publish a membership list so that members can contact each other and to ensure that we have your up to date details in our Club records. Please contact [treasurer@ggrec.org.au](mailto:treasurer@ggrec.org.au) and let Albert know if you have changed your postal address or email address etc. in the last couple of years.

Obviously, privacy is a major concern in this digital age so I am asking you to let Albert know if you want any of your personal information suppressed. The list is distributed to current financial members only. Deadline for changes is the 30<sup>th</sup> of September 2020.

The fields that we distribute are:

Surname, First Name, Callsign.

Street address, City, Postcode.

Phone Number and Email address.

## Topic for the next Natter Night.

To inject some technical discussion into the next natter night on Friday the 3<sup>rd</sup> of October, we will be looking at Satellite communications. You may have heard that the International Space Station (ISS) has recently activated an amateur repeater. The repeater can be accessed with a dual band hand held radio and has an uplink of 145.990 MHz FM and a downlink of 437.800 MHz FM. Some of our members have already made contacts through the ISS.

To help things along we suggest you look at the video series on YouTube posted by Peter Parker, VK3YE. The video titled Amateur Satellite Activity and Techniques can be found using the following link. <https://www.youtube.com/playlist?list=PLj8-NKcZtRf64IyCU4bWaULuKfFvwIUjJ>

## NZARC Newsletter

The Rotorua Amateur Radio Club sent us their newsletter “Short Hop - August 2020”.

Lots of interesting reading for you while we are in lockdown, if it’s not in your inbox, email the committee.

## GGREC Clubroom Maintenance

As soon as the Covid-19 restrictions are lifted to a point that we can meet again, we will be organising a working bee at our Clubrooms. We are currently compiling a maintenance list and everyone will be invited to come along and help out. Let’s hope it is before Christmas!

## GM and AGM Minutes

The minutes of the October General Meeting and the Annual General Meeting have now been posted to our GGREC Website for you to read.

Kind regards,

Bruno Tonizzo

Secretary GGREC (edited from Bruno’s original email “September GGREC Members Information Update”)

## Interesting YouTube Videos



EEVblog #1333 - Nano Diamond Self-Charging Battery DEBUNKED!

[https://youtu.be/uzV\\_uzSTCTM](https://youtu.be/uzV_uzSTCTM)



China's MILLION VOLT Energy Superhighway

<https://youtu.be/rThkjp-bp8M>

# Books, Books and more Books

By Michael Van den Acker VK3GHM

What books you ask? Well there are a few.

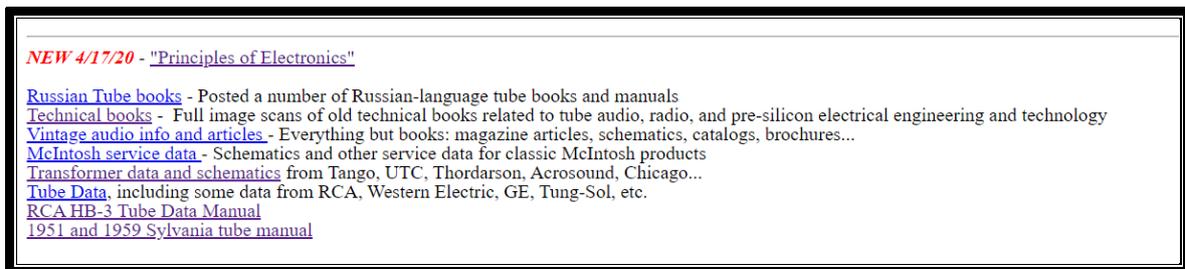
Need information on valves or tubes (according to the Americans), radio theory, crystal theory antennas, semiconductors, workshop practices, general reference material or would like to read a 1920's magazine while we are in lockdown during this pandemic.

If you do a search on the internet using your favourite search engine you can generally find the information that you are looking for, including full text books of years gone by.....

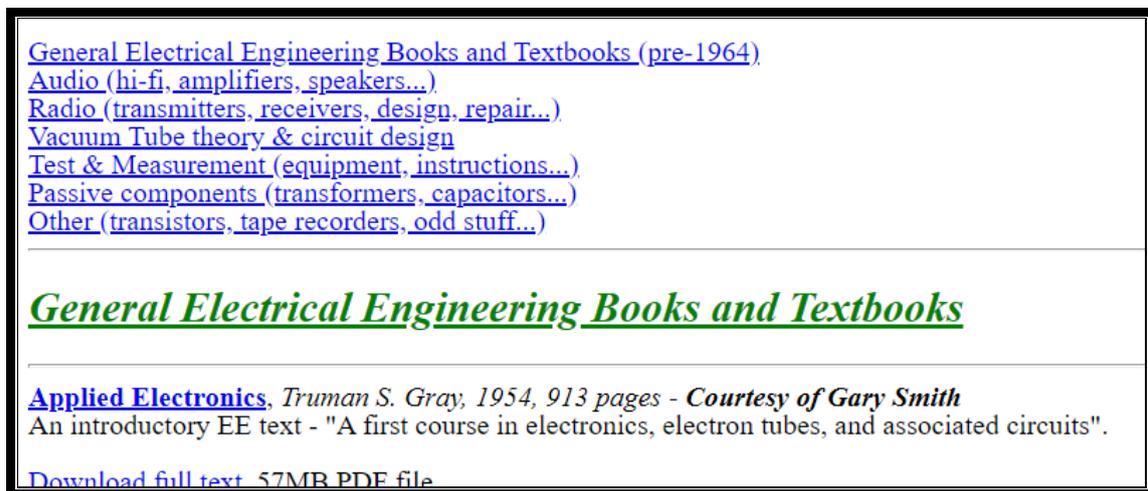
Over the years I have come across many websites that hold a various array of interesting books, texts and magazines. In this small article I hope to introduce you to some of them.

<http://tubebooks.org>

This website has a constantly growing selection of books. If you would like to know anything about valves and their operation or data this is the place to be. Here you will also find the highly regarded Radiotron designer's handbook both 3<sup>rd</sup> and 4<sup>th</sup> editions.



The image above shows you the main index.



This capture is the sub index of the "Technical books" category. Most books have an entry that includes the first few pages and the index as the first link and the full download in the second link after the description as can be seen above in the Applied Electronics entry.

On the tubebooks.org landing page one of the first links is <http://www.pmillett.com/>

Peter Millett's DIY Audio pages which itself has a selection of audio books and DIY materials. This is a popular site in its own right.

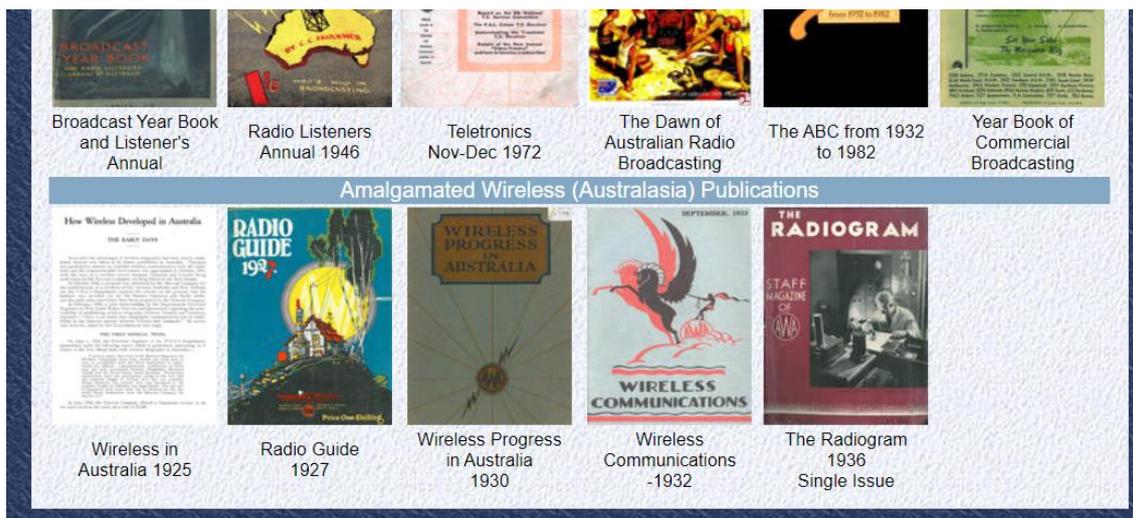
<https://worldradiohistory.com/>

This website is a ripper. It carries pdf versions of books and magazines from around the world.



This screen capture shows just a small section of what is available on the front page.

The site is chock full of Radio, Broadcast, Music, Technical books and magazines. It is hard in an article like this to give some idea of what is available but take my word for it the site is huge and well worth a look. Just make sure you set aside a few hours to browse because you will see something shiny and then head off in many directions. Lots of history to enjoy!!



This is the AWA section under Australia.

# Vintage Computing, pt 2



Several years after getting into the TRS-80, I picked up a Commodore VIC-20, however I was less than impressed, it's display was only 22 characters per line, and by the time it had made it onto my colour TV's screen it was not pretty, complete with a sea of colour/PAL artefacts swimming up the not so sharp screen.

I found this so hard on my eyes that I basically didn't use it that much. I was seeking the 'Commodore experience' however this unit effectively turned me off. Trying to write any software on it was frustrating to me as pretty much any line of code would wrap around a few times, meaning I was lucky to get a few lines of code on the screen at once, meaning endless scrolling. That and the fact there was basically no space between the lines.



If one partakes in the many online retro-computing sites, then you will find a hell of a lot of Commodore related 'stuff', however it's 99% Commodore 64, and then quite often game related. Earlier Commodore computers had 40, or more characters per line, The C64 has 40, so it looks like I slipped down a '22 character per line' hole. I now know what machine I needed, it was the Commodore C128, it has a proper 80 character per line mode. These days they are 'unobtainium'.

## Video Limitations and price

In the early days of home computing, cost of ownership was one of the main problems. They could either make their systems with an included video monitor, or rely on the owner's TV for the display. Early Commodore & Tandy machines came with a screen, however to expand the home market, most went down the home TV route, with Apple being the main hold out in this area. Tandy supported both, with their Z80 based lines having included screens, and their 6809 based colour computers requiring a TV. Commodore being almost exclusively TV based.

Then came colour, and that fairly well cemented the TV as the preferred display. These days cheap colour LCD computer displays are a 'dime a dozen', not back then. As most of this gear was coming from America, the designs were based on an NTSC TV, in which there are 483 lines of interlaced video. Interlaced video is almost useless for computer text display, so the specs of the system are slightly bent so that we only have non-interlaced video, this reduces the NTSC down to just 241 lines. With PAL we get 525 interlaced, or 262 non, slightly better. However, apart from British designs, everything started life as NTSC, then was later adapted to PAL.

So this is why computers like the VIC-20 had all their text lines scrunched up against each other, early composite (analogue) TV's were the problem, not to mention the video bandwidth of broadcast NTSC, 40 characters was really pushing it, no sharp text here.



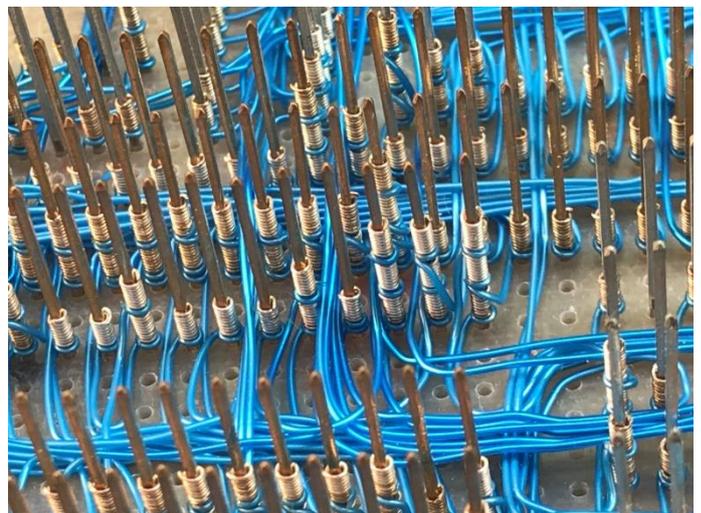
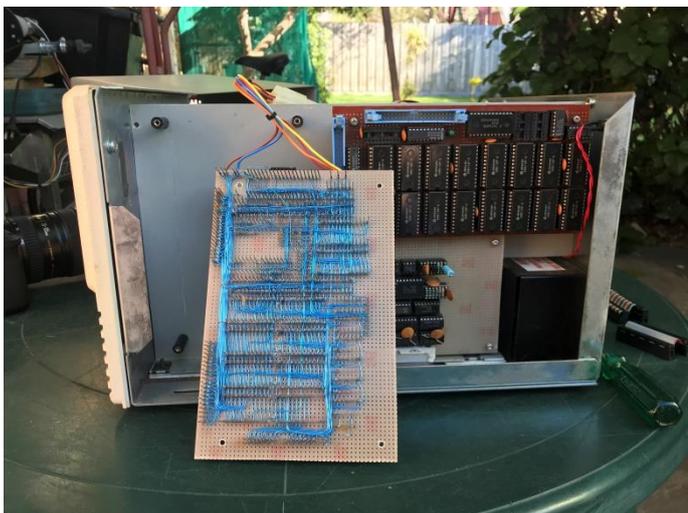
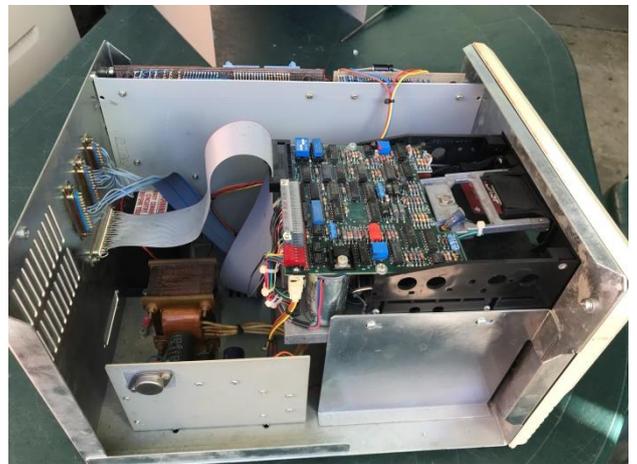
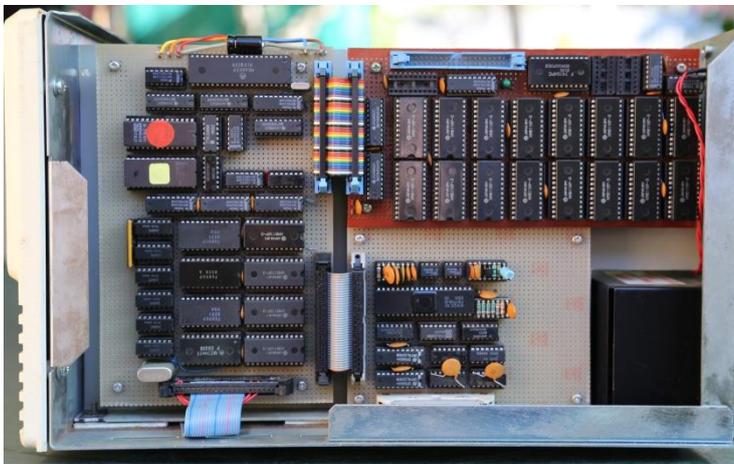


This is the final build of my 'SWTS 6800' system.

It has three serial ports, one 40track single sided drive, with an external floppy drive connector.

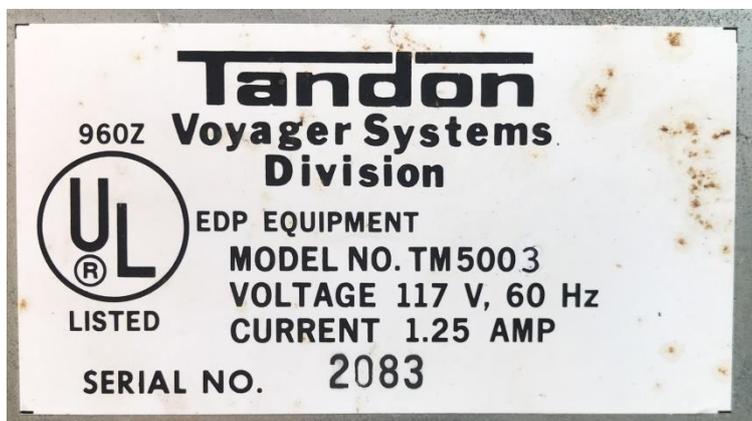
*It took me ages to dig it out from the corner of my study, maybe one day I will have a go at getting it going.*

However, writing this story means I cannot allocate a day or so to hooking it up and remembering how to drive it. (And fix it....)



As mentioned before, it is all but entirely built with wire-wrap, the only exceptions are the power supply board and disk drive.

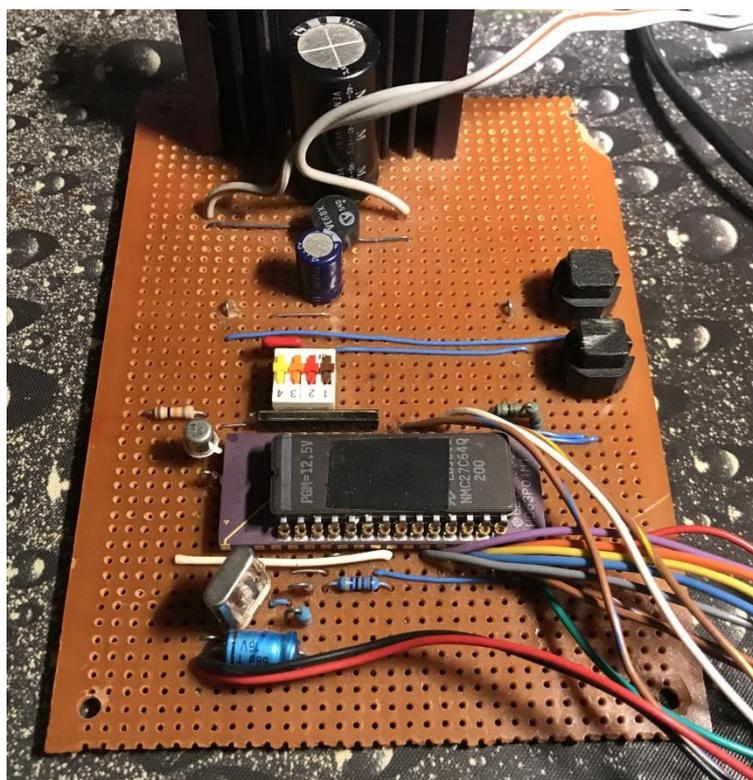
It is built in an old Tandon TM5003 enclosure. When I acquired the Tandon, it had already been stripped so I never knew what it was. I've tried trolling the internet to no avail. The only reference I can find is to the Tandon Corporation in Wikipedia, started in 1975 making disk drives, then falling on hard times by 1983, when their shares fell from a high of \$35 to \$0.50...



I never got around to removing this label from the back panel, probably as a reminder of a job not yet completed, as in tracking down just what this thing was in the first place.

Tandon's primary business was disk drives, however this is an awfully big and heavy box just for one disk drive.

Maybe it had a pile of electronics to allow a drive to be connected to an unknown minicomputer of some sort. I cannot imagine the target being a main frame. Also as HP and Commodore machines of that time used HP-IB, (IEEE488) and there is not a suitable cut out in the back panel, I doubt it was one of these....



Most of my 6800 builds actually used a 6802 processor, code wise, totally identical, however needing less support chips to make it work.

All was well, until Hitachi released the HD6303. I managed to grab a pile of these 6303 piggyback IC's, with basically everything needed to make a working project included. Pretty much all you needed was a crystal and a source of 5V. No provisions were needed for the obligatory EPROM with your code, as that rode piggy-back on top of the micro.

Normally to connect external devices to a 6800, you would use a PIA, a 6820 or 6821 (or their equivalent, made of logic IC's), however the Hitachi 6303 also had this inbuilt, along with a serial port and a timer, meaning a keypad, or LCD display etc. can be directly connected. This board I used for demonstrating LCD modules at several hamfests. These days you would reach for an Arduino, however in this case all you would save was the crystal. – Mind you, the timing on this board is far far better than a lot of Arduino's. Arduino's tend to use ceramic resonators that drift all over the place, as I found out to my horror when I made an Arduino based frequency counter.

I have one of these IC's driven from a 5MHz oven stabilised oscillator out of an old navigation receiver. Unadjusted, this micro kept time to within 1 second in 6 months – Not bad.

One bit of kit I built from a magazine project was an EPROM emulator, this plugs into your board in place of its EPROM. You then upload your programs to the emulator via a serial port. In this way you can make multiple changes to your code without having to wait for an EPROM programmer and eraser. This can quite dramatically cut the time it takes to get all the bugs out of your code. There is nothing like wearing out an EPROM socket, then contemplating undoing all that lovely wire wrap so it can be replaced.....

*Paul VK3TGX*

# Power Play

by Ian Jackson VK3BUF

On September 3 we had some excitement when a storm front passed through our area in Drouin West on a bleak Thursday evening. The wind was pretty intense, over 100kph, just as the daylight was fading. Unfortunately, this was on top of a few weeks of rain and the ground was exceptionally soft and the soil around the trees had little strength. When the lights all winked out in the house, I knew that this was not going to come back anytime soon. Indeed, half of the circuit breakers and earth-leakage breakers in the house had tripped out, which was an ominous sign of a power surge. Looking out of the kitchen window to the South-West we can usually see some street lights in Drouin, about 4km away, but they too were dark.

It was time to go to Plan B.

In our utility room I have a control box with a large contactor that connects most of the house power to one phase of the mains grid. Whenever the network power 'disappears' for some reason, this contactor releases and automatically re-directs all of the lights and power points to a heavy cable that runs underground to a small shed in the next paddock. (This is where the IRLP node hardware also lives) Our other high-current systems such as cooktops, air conditioners and hot water boosters are all connected to the second phase of our dual-240V (480V) supply. These second phase devices are purposely not backed up and simply remain dead during an outage. In the utility shed I have a small 3.5KVA generator and a stash of spare fuel. The generator has a basic pull-start arrangement, but it is fairly reliable. It started up ok and I returned to the house.



*Small, but useful in emergencies*



*Auto-changeover contactor & power switch*

Back in the utility room, we have another big switch labelled **Critical Power** and **All Power**. This is normally left in the Critical Power position. It means that upon startup the generator is only trying to run lighting, refrigerators & freezers, the shack and the workshop. It gives me a chance to do a walk around and ensure that high current appliances such as room radiators, kettles, toasters etc are all isolated before all the rest of the power points are enabled.

A big load with a heating element will soon stall our modest sized generator, so we must do without them.

Also in the service room are a pair of wall mounted gate valves for our water supply. I closed the valve that isolates the tank water and opened the valve that re-connects the house to town water. This way the generator was not trying to service the 800W pressure pump that normally delivers water to the house.

Home heating was not a problem, as this comes from the wood heater in the lounge and it was already running. Dinner was prepared on a camping stove and gas bottle that we temporarily set up in the kitchen.

So we were up and running again with mostly normal systems. Our internet is beamed to us from a wireless site 5km away and it was still working ok.



*Switching to town water avoids the need for the extra electric pump load*

The emergency services website said that trees were down in our immediate area. Armed with a torch and a heavy jacket I decided to go for a walk. Even though the wind had mostly dropped, outside it was as dark as the inside of a black dog.

I didn't get very far. About 30 metres to the left of our driveway a giant gum tree had gone over Old Sale Road and crushed the power lines into the far-side fence line. The big pole opposite our driveway was standing, but twisted and wrecked. The 50KVA pole transformer was leaking oil. Nobody was visiting from that direction anytime soon. I don't have a lot of faith in 22KV wires on the ground, so I stayed well away from that mess. For all I knew, a kilometre of barbed wire fence could now be alive.



***Cutting a path back to civilisation early on the following morning***

To the right of our driveway I walk about a hundred metres before I encountered two more giant trees, also blocking the road and flattening power lines. It was obvious that nothing was going to happen for a little while, so I went back inside, sharpened my chain saw and had an early night.



***Access to the East was blocked by more fallen trees***

I knew that our workshop team was going to have problems reaching us the following morning, so I had an early start. The carnage was pretty big. About half a kilometres of high and low voltage lines were on the ground and some of the poles were leaning horribly. By then I had notice that the power in our road had been isolated.

I began cutting a vehicle sized gap in one of the fallen trees. A few hours later a cleanup crew did arrive. It took them about four hours just to clear the road. This road crew also

stood up the damage power poles. By then everyone had arrived for work and our workshop was functioning normally under generator power.

One of the cleanup crew came over and introduced himself. I didn't recognise him, but then again, he was wearing a Covid19 facemask. It turns out that he had visited us nearly 20 years earlier. He was the gent I had paid a token amount to bore the 3 metre hole and insert the post for my Nally (style) tower using his specialised power-pole installation truck. Back then, the entire task had only taken him 16 minutes to complete. I only had to guy the pole vertical and add the concrete .

It wasn't until Saturday morning that a line crew arrived. This impressed me as I knew they had been very busy elsewhere during the past day. It was a Downer's contract team with four boom-lift trucks and half a dozen other assorted vehicles.

A crew of about 15 guys were in attendance and got stuck into it. A vast amount of cable and hardware had to be replaced, but they were very good at their job. A new power transformer arrived and was lifted into position.



*They have some impressive vehicles to work with*

I wandered over to the crew while they were having a lunch break and had a chat with them.

It was good to see that all of their trucks were fitted with central tyre inflation gear. One of the team proceeded to tell me how it worked, which was kind of funny, since all their controls had come from our workshop.

They all conceded that they would never run a lift truck without it now, as often a lot of their work was off-road in boggy paddocks.

While there are around 2,700 trucks fitted out with CTI so far, I don't get to see much of it in action, so I took a few pics.

It turns out the damage wasn't limited to the street. The 22KV falling on the dual-240V lines below gave us quite a surge and had blown apart half a dozen 'smart meters' in nearby homes.

It was about 8:00pm on the Saturday when they opened up our meter box to check things out. It became evident that the meter unit had literally cracked open and blasted the remote transponder RF module out of the top of its enclosure.



*Wires were everywhere*

This explained why so many of our circuit breakers had tripped all in one go on the Thursday night.

This explained why so many of our circuit breakers had tripped all in one go on the Thursday night.

The crew carried spares and set about replacing it.

Although the mains fuses were pulled, our outside lights was still lighting up the house from the generator. It was still safe to repair the switchboard as only the utility room sub-board was live.



*Each truck was fitted with CTI*

It was a little after 9pm before they flicked the big switch to restore our power. I heard the contactor on the other side of the wall to the meter box clunk back in as the house automatically re-connected itself to the grid. In the distance I could hear the generator change in revs as the load was removed.

As soon as power was restored, I did a walk-around testing the integrity of all the appliances. I'd wondered if we had blown a few MOV's etc. on some of the air conditioners, but they were still intact. (I'd had to repair some of these systems about six years ago after a nearby lightning strike) The only appliance I found that had failed was an older DVD player. I took the lid off for an inspection and found a Switchmode regulator with a blown top and some blackened SMD devices.



*The smart meter, now working again*

I didn't try to repair it, as the time required to identify and replace the blown parts was a far greater expense than the \$40 needed for an entire replacement unit.

It had been a little over 2 days since the storm had hit. The work that was accomplished by crews in that time was impressive. As much as our populace likes to complain about services that are less than perfect, the teams that sprang into action on such short notice are a sign that we live in a country where we do get a lot of things right.

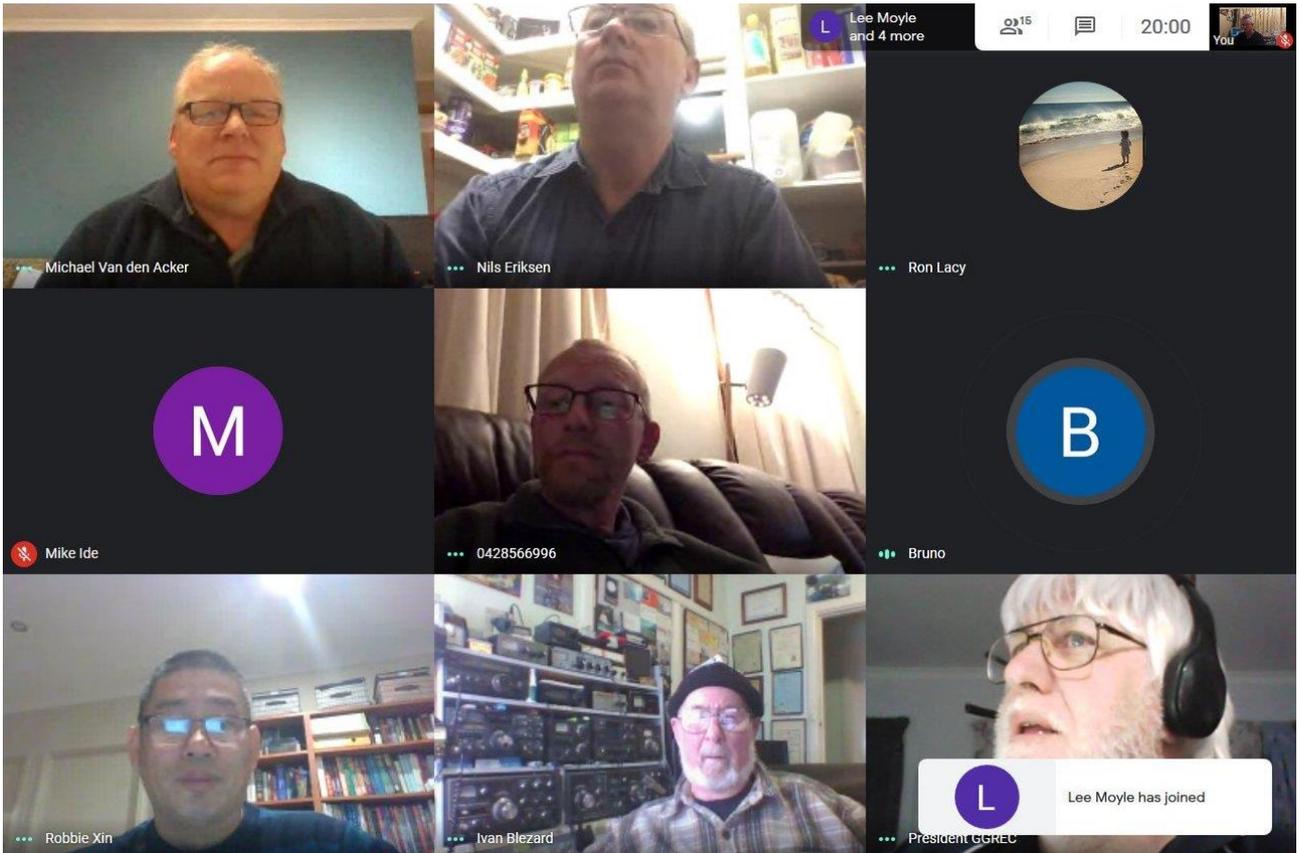
It's not just the blokes that showed up on the day, it is the training behind each of them, the access to critical spares and the carefully kitted out vehicles. The crew quickly worked out precisely what was needed and got stuck into the job. Their support systems came together exactly when it needed to. Well done guys.

## As Seen on Google Teleconference

AGM 21/08/2020



# General Meeting 21/08/2020





# Club Information



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

All physical meetings suspended due to the coronavirus restrictions

## Office bearers

President	Micheal Van Den Acker	VK3GHM	Web Master	-	-
Admin Sec	Bruno Tonizzo	VK3BFT	Magazine Editor	Paul Stubbs	VK3TGX
Treasurer	Albert Hubbard	VK3BQO	Property Officer	'committee'	
General 1	Bruce Williams	VK3BRW	Assoc. Secretary	Bruno Tonizzo	VK3BFT
General 2	Paul Stubbs	VK3TGX			

## 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](mailto:editor@ggrec.org.au) Cut off, 10<sup>th</sup> of the month  
 All other Club correspondence to: [secretary@ggrec.org.au](mailto:secretary@ggrec.org.au)  
 or via post : GGREC, 408 Old Sale Rd, Drouin West 3818  
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